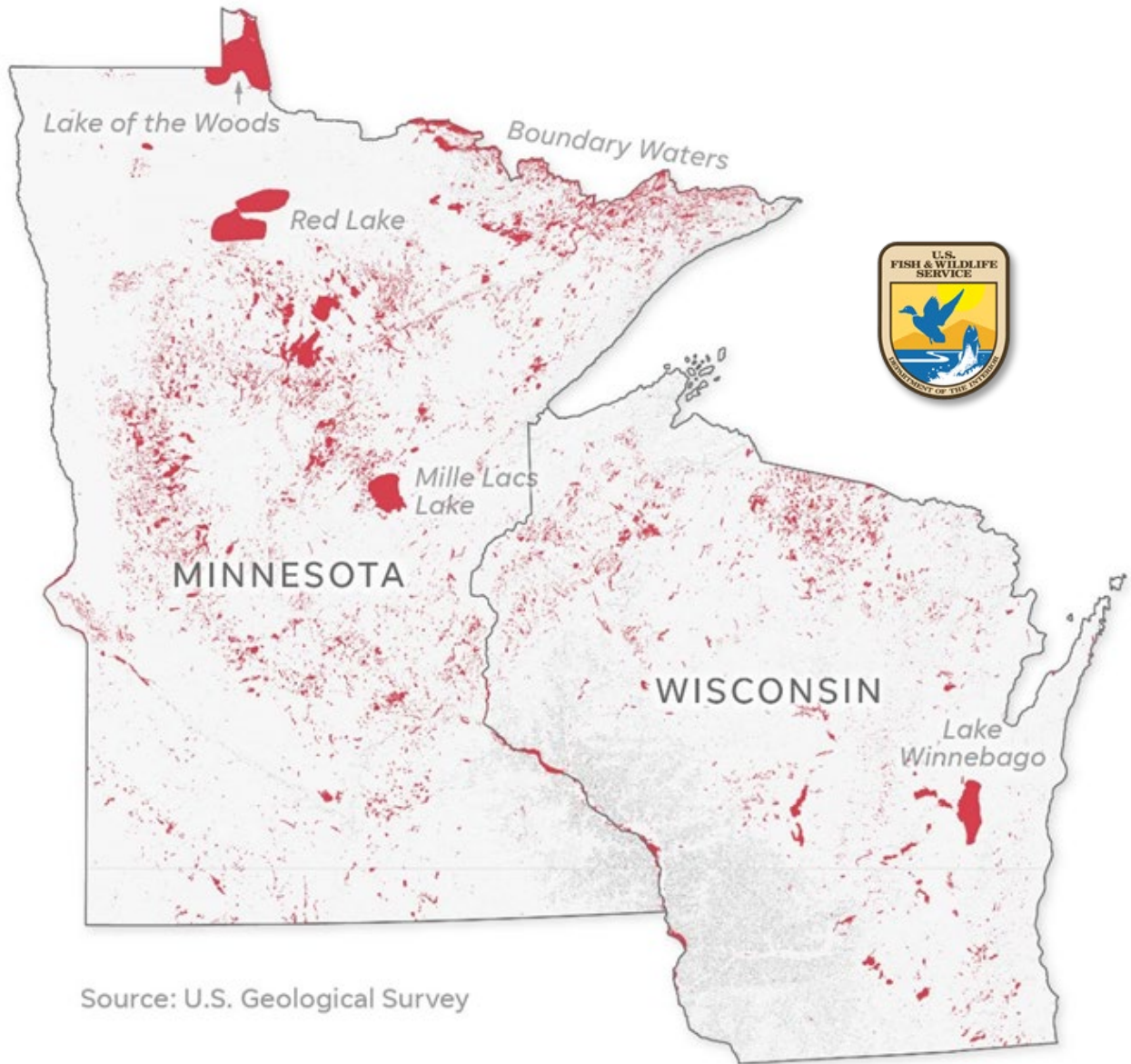


Minnesota and Wisconsin Endangered Species Determination Key Standing Analysis



Minnesota-Wisconsin Ecological Services Field Office
January 2023

Contents

Introduction	1
Proposed Action.....	2
Action Area.....	3
Covered Species/Habitats	3
Acknowledgments.....	4
Contact information.....	4
Standing Analysis Approval.....	5
Appendix 1 – Canada Lynx (<i>Lynx canadensis</i>).....	6
Appendix 2 – Dakota Skipper (<i>Hesperia dacotae</i>)	13
Appendix 3 – Dwarf Lake Iris (<i>Iris lacustris</i>)	20
Appendix 4 – Eastern Massasauga Rattlesnake (<i>Sistrurus catenatus</i>).....	26
Appendix 5 – Eastern Prairie Fringed Orchid (<i>Platanthera leucophaea</i>).....	35
Appendix 6 – Fassett’s Locoweed (<i>Oxytropis campestris var. chartacea</i>).....	41
Appendix 7 – Gray Wolf (<i>Canis Lupus</i>).....	46
Appendix 8 – Higgins Eye Pearlymussel (<i>Lampsilis higginsii</i>)	51
Appendix 9 – Hine’s Emerald Dragonfly (<i>Somatochlora hineana</i>).....	56
Appendix 10 – Karner Blue Butterfly (<i>Lycaeides melissa samuelis</i>).....	62
Appendix 11 – Leedy’s Roseroot (<i>Rhodiola integrifolia ssp. leedyi</i>).....	68
Appendix 12 – Mead’s Milkweed (<i>Asclepias meadii</i>).....	73
Appendix 13 – Minnesota Dwarf Trout Lily (<i>Erythronium propullans</i>)	79
Appendix 14 – Northern Wild Monkshood (<i>Aconitum noveboracense</i>).....	85
Appendix 15 – Northern Long-eared Bat (<i>Myotis septentrionalis</i>).....	90
Appendix 16 – Piping Plover (<i>Charadrius melodus</i>).....	93
Appendix 17 – Pitcher’s Thistle (<i>Cirsium pitcheri</i>)	100
Appendix 18 – Poweshiek Skipperling (<i>Oarisma poweshiek</i>)	106
Appendix 19 – Prairie Bush-clover (<i>Lespedeza leptostachya</i>)	113
Appendix 20 – Rufa Red Knot (<i>Calidris canutus rufa</i>)	119
Appendix 21 – Rusty Patched Bumble Bee (<i>Bombus affinis</i>).....	125
Appendix 22 – Sheepnose Mussel (<i>Plethobasus cyphus</i>).....	136
Appendix 23 – Snuffbox Mussel (<i>Epioblasma triquetra</i>)	141
Appendix 24 – Spectaclecase Mussel (<i>Cumberlandia monodonta</i>).....	146
Appendix 25 – Topeka Shiner (<i>Notropis topeka</i>)	151
Appendix 26 – Western Prairie Fringed Orchid (<i>Platanthera praeclara</i>)	158
Appendix 27 – Winged Mapleleaf Mussel (<i>Quadrula fragosa</i>)	164

Introduction

This standing analysis supports the “Minnesota-Wisconsin Endangered Species Determination Key” (Dkey) delivered by the U.S. Fish and Wildlife Service (Service)’s Information for Planning and Consultation (IPaC) system. The Service’s Minnesota-Wisconsin Ecological Services Field Office (MNWIFO) developed this DKey to streamline the process of reviewing certain routine and predictable projects that are not likely to result in adverse effects (or take) of Federally threatened, endangered, candidate, and proposed species in Minnesota and Wisconsin.

In Fiscal Year 2022, the MNWIFO received over 1,000 projects that it reviewed and determined would not significantly affect or result in the prohibited take of species or habitats listed under the Endangered Species Act (ESA) of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*). The routine nature of the review of various Federal and non-Federal projects provides an opportunity for the MNWIFO to programmatically evaluate the effects of common activities on threatened and endangered species. Most incoming projects overlap with the Species List Area (SLA) of multiple listed species in Minnesota and Wisconsin. The availability of a DKey covering all threatened and endangered species and critical habitats in Minnesota and Wisconsin (as well as candidate and proposed species) will eliminate the need for the MNWIFO to individually review large numbers of projects and will provide Federal Action Agencies, consultants, and project proponents an immediate and consistent response to their requests for consultation, technical assistance, or conservation planning assistance.

To use this Dkey, applicants enter their project area in IPaC, and the program determines whether the project’s geographic extent intersects the SLA of any Federally listed, candidate, or proposed species. The applicant will have the option to complete an available determination key, including this Dkey, for those species for which their project area intersects an SLA. The Dkey starts by asking a series of questions to determine if the project qualifies for the Dkey (see General Exclusions below). If they don’t qualify for the Dkey, they will be notified that they must consider effects to threatened, endangered, candidate, or proposed species outside of the Dkey. If the user’s project qualifies for the Dkey, they will respond to a series of questions based on the species that may be present in the action area. Depending on how they answer the questions and the corresponding determinations that are reached, they will receive a verification letter from IPaC. For Federal projects that reach a “not likely to adversely affect (NLAA)” determination, there is a 30-day “verification period” to allow the Service to review the project details and ensure the action meets the criteria for a NLAA determination based on local knowledge. Verification letters will indicate that if the project proponent does not hear otherwise within the 30-day timeframe, the NLAA determination is verified, and they can proceed with their action as described in the IPaC report and concurrence verification letter. If the Field Office identifies any unanticipated impacts during the verification period, the reviewing biologist may request additional information during this timeframe to validate or further evaluate the effects determination reached through the DKey. There is no verification period for non-Federal projects or for “no effect” determinations. If the user gets a “may affect” determination for any species, they are advised to contact the Minnesota-Wisconsin Field Office to complete consultation outside of the Dkey. All verification letters include reinitiation language as follows: “The Service recommends that you contact the Minnesota-Wisconsin Ecological Services Field Office or re-evaluate the project in IPaC if: 1) the scope or location of the proposed Action is changed; 2) new information reveals that the action may affect listed or candidate species or designated critical habitat in a manner or to an extent not previously considered; 3) the Action is modified in a manner that causes previously unanticipated effects to listed species or designated critical habitat; or 4) a new species is listed or critical habitat designated. If any of the above conditions occurs, additional

consultation with the Service should take place before project changes are final or resources committed.”

Proposed Action

The proposed Action is the compilation of many different types of projects that, depending on their size and specific location, often do not significantly affect any Federally listed threatened, endangered, or candidate species or critical habitats in Minnesota and Wisconsin. Common project types include, but are not limited to, the following:

- Vegetation management, including mowing, forestry activities, prescribed burning, and harvest
- Construction, maintenance, operation, and/or removal of:
 - Roads and trails
 - Communication towers
 - Transmission and utility lines
 - Bridges and culverts
 - Oil and gas pipelines
 - Solar power facilities
 - Hydroelectric facilities/dams
 - Mines/quarries
 - Canals/levees/dikes
- Commercial, residential, and recreational developments
- Agricultural activities
- Site/habitat restoration/enhancement
- Shoreline protection/beach nourishment
- Dredging and filling of wetlands/waterbodies
- Military operations

General Exclusions:

To use this standing analysis and receive a conclusion from IPaC through the DKey, projects may NOT include the following:

1. Purposeful take of a listed animal
2. Construction or operation of wind turbines
3. Construction of a communication tower that uses guy wires or is over 450 feet in height
4. Aerial or other broad application of chemicals

To ensure compliance with the ESA, project-specific consultation (or other programmatic consultation, if applicable) with the Service may be necessary for projects including the excluded actions listed above.

Additionally, to use this standing analysis and receive a conclusion from IPaC, projects must incorporate the species/taxon-specific conservation measures detailed in the attached appendices, as appropriate (**Appendix 1-27**).

Action Area

The Action Area is the entirety of the states of Minnesota and Wisconsin. Because the DKey is intended for use by future projects, we cannot identify the specific action areas of individual projects.

Covered Species/Habitats

Species and habitats covered by the Minnesota-Wisconsin Endangered Species DKey include all² Federally listed species (also proposed and candidate) and critical habitats that occur within the state, as follows¹:

Birds

- Eastern black rail (*Laterallus jamaicensis jamaicensis*)- T
- Piping Plover (*Charadrius melodus*)- E
- Rufa Red Knot (*Calidris canutus rufa*)- T
- Whooping Crane (*Grus americana*)- NEP

Mollusks

- Snuffbox (*Epioblasma triquetra*)- E
- Sheepnose (*Plethobasus cyphyus*)- E
- Spectaclecase (*Cumberlandia monodonta*)- E
- Higgins eye pearlymussel (*Lampsilis higginsii*)- E
- Winged mapleleaf (*Quadrula fragosa*)- E
- Iowa Pleistocene snail (*Discus macclintocki*)- E

Fish

- Topeka shiner (*Notropis topeka*)- E

Insects

- Dakota skipper (*Hesperia dacotae*)- T
- Hine's Emerald Dragonfly (*Somatochlora hineana*)- E
- Karner Blue Butterfly (*Lycaeides melissa samuelis*)- E
- Monarch Butterfly (*Danaus plexippus*)- C
- Poweshiek Skipperling (*Oarisma poweshiek*)- E
- Rusty patched bumble bee (*Bombus affinis*)- E

Mammals

- Canada Lynx (*Lynx canadensis*)- T
- Gray Wolf (*Canis lupus*)- T
- ²Northern Long-eared Bat (*Myotis septentrionalis*)- T
- Tricolored Bat (*Perimyotis subflavus*)- PE

¹T = threatened, E = endangered, PE = proposed endangered, C = candidate, CH = critical habitat, NEP = nonessential experimental population

²Northern Long-eared Bat (*Myotis septentrionalis*) is not covered by the Minnesota-Wisconsin Endangered Species DKey because it has its own standalone DKey

Reptiles

- Eastern Massasauga Rattlesnake (*Sistrurus catenatus*)- T

Plants

- Dwarf Lake Iris (*Iris lacustris*)- T
- Eastern Prairie Fringed Orchid (*Platanthera leucophaea*)- T
- Western prairie fringed orchid (*Platanthera praeclara*)- T
- Fassett's locoweed (*Oxytropis campestris* var. *chartacea*)- T
- Leedy's roseroot (*Rhodiola integrifolia* ssp. *leedyi*)-T
- Mead's milkweed (*Asclepias meadii*)- T
- Pitcher's Thistle (*Cirsium pitcheri*)- T
- Prairie bush-clover (*Lespedeza leptostachya*)- T

Critical Habitats (CH)

- Canada Lynx (*Lynx canadensis*) CH
- Gray Wolf (*Canis lupus*) CH
- Hine's Emerald Dragonfly (*Somatochlora hineana*) CH
- Piping Plover (*Charadrius melodus*) CH
- Poweshiek Skipperling (*Oarisma poweshiek*) CH
- Topeka shiner (*Notropis topeka*) CH

Acknowledgments

We would like to acknowledge the U.S. Army Corps of Engineers and Tetra Tech for their assistance with developing summaries and a literature review for each species described in the appendices. Special thanks to Todd Vesperman, AJ Kitchen, and Johathan Bakken (U.S. Army Corps of Engineers); and Erin Hague and Andrea Rinne (Tetra Tech) for developing many of these materials while working on the Corps' Standard Local Operating Procedures for Endangered Species (SLOPES).

Contact information

For questions and inquiries regarding this standing analysis or the Determination Key, please contact the USFWS Minnesota-Wisconsin Field Office at 952-858-0793 or TwinCities@fws.gov.

Standing Analysis Approval

This standing analysis, and the information contained in its appendices, is approved for use as a self-determination tool when used in conjunction with the Service's Minnesota-Wisconsin Endangered Species Determination Key in IPaC.

Approved by:

Shauna Marquardt, Field Supervisor
Minnesota-Wisconsin Ecological Services Field Office

Appendix 1 – Canada Lynx (*Lynx canadensis*)

Canada Lynx Species Summary

The Canada Lynx is currently listed by the U.S. Fish and Wildlife Service (USFWS) under the Endangered Species Act (ESA) as ‘threatened’ across its range (USFWS, 2000). Threats to Canada Lynx in the Great Lakes region include timber harvesting and fire suppression on non-Federal lands (USFWS, 2005). Habitat fragmentation and vehicle deaths also negatively impact the species. The USFWS species profile for the Canada Lynx can be found at <https://ecos.fws.gov/ecp/species/3652>. Additional information can be found at <https://www.fws.gov/species/canadian-lynx-lynx-canadensis>. A summary of the ecology of this species can be found in the USFWS Canada Lynx recovery outline (USFWS, 2005), most recent 5-year review (USFWS, 2017a), and the current Species Status Assessment (USFWS, 2017b). Critical habitat was designated for the Canada Lynx in 2014 (USFWS, 2014).

Canada Lynx Biological Information

The Canada Lynx is a medium-sized cat with long legs (hind legs appear longer than the front legs) (MDNR, 2022), large, well-furred paws, long tufts on the ears, and a short, black-tipped tail. The winter pelage of the Canada Lynx is dense and has a grizzled appearance with grayish-brown mixed with buff or pale brown fur on the back, and grayish-white or buff-white fur on the belly, legs, and feet (**Figure 1**). The summer pelage of the Canada Lynx is more reddish to gray-brown. Some Canada Lynx also have dark spots (MDNR, 2022).

Adult males average 22 pounds (10 kilograms [kg]) in weight and 33.5 inches (85 centimeters [cm]) in length (head to tail), and females average 19 pounds (8.5 kg) and 32 inches (82 cm). The Canada Lynx’s long legs and large “snowshoe” like feet make it highly adapted for hunting in deep snow. Canada Lynx can be detected using snow track or camera trap surveys over large township-sized areas (USFWS, 2021).

Snowshoe Hares are the primary prey of Canada Lynx, comprising the bulk of the Canada Lynx diet throughout its range. Without high densities of Snowshoe Hares, Canada Lynx are unable to sustain populations despite utilizing a multitude of other prey when Snowshoe Hare numbers are low. Canada Lynx have cyclic populations (populations increase to a peak over a few years and then decrease to a low over a few years) that correspond with Snowshoe Hare population cycles (WDNR, 2022). Other prey species include Red Squirrel, Grouse, Flying Squirrel, Ground Squirrel, Porcupine, Beaver, Mice, Voles, Shrews and Fish. Ungulate carrion may also be consumed.

Mating occurs in late winter, and 1 to 5 kittens are born following a 65-day gestation period. In years of low or average Snowshoe Hare numbers, few or no kittens survive, but when Snowshoe Hares are abundant, kitten survival is very high. Kittens stay with their mother for 1 year before dispersing to their own home range (MDNR, 2022).



Figure 1. Canada Lynx (Keith Williams, USFWS)

Canada Lynx Suitable Habitat

In Minnesota, Canada Lynx habitat is generally mixed deciduous/conifer forest characterized by low-relief hilly landscapes with glacial features and an elevation from sea level to 2,400 feet (730 meters) including many lakes and rivers (USFWS, 2017b). This includes a mix of upland conifer and hardwood interspersed with lowland conifer, Alder or Willow shrub swamps and Black Spruce or Tamarack bogs.

Canada Lynx are most likely to be found in areas with accumulation of deep snow (**Figure 2**) that have high densities of Snowshoe Hares. The Canada Lynx is most likely to appear in Minnesota following a crash of the Snowshoe Hare population in Canada (MDNR, 2022). Canada Lynx are uncommon in Wisconsin, with only a few visitors from Canada (WDNR, 2022). It is likely that historically the Canada Lynx intermittently dispersed into Wisconsin from the Canadian population, or occurred as small, naturally ephemeral populations. It is not believed that they are persistent resident breeding populations(USFWS, 2017b).

Individual Canada Lynx maintain large home ranges generally between 12 to 83 square miles (31 to 215 square km). The size of Canada Lynx home ranges varies depending on abundance of prey, gender and age, season, and the density of Canada Lynx populations. When densities of Snowshoe Hares decline, Canada Lynx enlarge their home ranges to obtain enough food to survive and reproduce. Canada Lynx also make long distance exploratory movements outside their home ranges. Preliminary research supports the hypothesis that Canada Lynx home ranges at the southern extent of the species range are generally large compared to those in the core of the range in Canada, indicating a relative reduction of food resources in these areas.



Figure 2. Canada Lynx habitat, Superior National Forest, MN (U.S. Department of Agriculture)

Canada Lynx Critical Habitat

Critical habitat was designated for the Canada Lynx in 2014 (USFWS, 2014). Critical habitat for the Canada Lynx consists of the following biological and physical features (e.g. Primary Constituent Elements): boreal forest landscapes supporting a mosaic of differing successional forest stages and containing

- (a) presence of Snowshoe Hares and their preferred habitat conditions, which include dense understories of young trees, shrubs or overhanging boughs that protrude above the snow, and mature multistoried stands with conifer boughs touching the snow surface;
- (b) winter conditions that provide and maintain deep fluffy snow for extended periods of time;
- (c) sites for denning that have abundant coarse woody debris, such as downed trees and root wads; and
- (d) matrix habitat (e.g., hardwood forest, dry forest, non-forest, or other habitat types that do not support Snowshoe Hares) that occurs between patches of boreal forest in close juxtaposition (at the scale of a Canada Lynx home range) such that Canada Lynx are likely to travel through such habitat while accessing patches of boreal forest within a home range.

Canada Lynx Determination Key Guidance

The proposed action is the compilation of many different types of projects that, depending on their size and specific location, often do not significantly affect any Federally listed threatened or endangered species or critical habitats in Minnesota and Wisconsin. Common project types include, but are not limited to, the following:

- Vegetation management, including mowing, forestry activities, prescribed burning, and harvest
- Construction, maintenance, operation, and/or removal of:
 - Roads/trails
 - Communication towers
 - Transmission/utility lines
 - Bridges/culverts

- Oil/gas pipelines
- Solar power facilities
- Hydroelectric facilities/ dams
- Mines/quarries
- Canals/levees/dikes
- Commercial/residential/recreational developments
- Agricultural activities
- Site/habitat restoration/enhancement
- Shoreline protection/beach nourishment
- Dredging and filling of wetlands/waterbodies
- Military operations

Not Likely to Adversely Affect

Projects that intersect the Canada Lynx species list area may result in a Not Likely to Adversely Affect (NLAA)¹ determination if any of the following occur:

1. The project is NOT located in Critical Habitat (CH) AND all of the following apply:
 - does NOT involve direct² or indirect³ harm to Canada Lynx
 - is NOT associated with the U.S. Forest Service (USFS)
 - does NOT fall within the boundaries of a Lynx Analysis Unit⁴ (LAU)
 - will NOT result in greater than 10 acres of change to habitat quality, quantity, or availability.⁵
2. The project is NOT located in CH AND all of the following apply:
 - will NOT involve direct² harm to Canada Lynx
 - is associated with the USFS
 - the action complies with the Canada Lynx standards and guidelines outlined in the Forest Plan.⁶
3. The project is NOT located in CH AND all of the following apply:
 - will NOT involve direct² harm to Canada Lynx
 - the action falls within the boundaries of a LAU⁴
 - the action is NOT associated with the USFS
 - the action complies with the Conservation Measures (Chapter 5) in the Canada Lynx Conservation Assessment and Strategy.⁷
4. The project is located within CH AND all of the following apply:
 - is NOT associated with the USFS
 - the action does NOT fall within the boundaries of a LAU⁴
 - will NOT result in greater than 10 acres of change to Canada Lynx or Snowshoe Hare habitat quality, quantity or availability.⁵
5. The project is located within CH AND all of the following apply:
 - is associated with the USFS
 - the action complies with the Canada Lynx standards and guidelines outlined in the Forest Plan.⁶
6. The project is located within CH AND all of the following apply:
 - the action falls within the boundaries of a LAU⁴
 - the action complies with the Conservation Measures (Chapter 5) in the Canada Lynx Conservation Assessment and Strategy.⁷

Projects associated with the USFS must include the following for a NLAA¹ determination to apply:

- No direct² harm to the species (e.g., mammal trapping, poison bait).
- Management activities on USFS lands shall not change more than 15% of Canada Lynx habitat on USFS land within a LAU⁴ to an unsuitable condition within a 10-year period.
- In LAUs⁴ on USFS land, allow no net increase in groomed or designated over-the-snow trail routes unless the designation effectively consolidates use and improves Canada Lynx habitat through a net reduction of compacted snow areas.
- Limit disturbance within each LAU⁴ on USFS land as follows: if more than 30% of the total Canada Lynx habitat (all ownerships) within a LAU⁴ is currently in unsuitable condition, no further reduction of suitable conditions should occur as a result of vegetation management activities by the National Forest. LAUs⁴ 44 and 46 are excepted from this guideline. (Refer to Canada Lynx Appendix Section 5 in the Forest Plan⁶ for information on exceptions).

May Affect

Projects that intersect the Canada Lynx species list area will result in a May Affect (MA)⁸ determination if any of the following occurs:

- The project is NOT located in CH AND has potential to involve direct² harm to the species.
- The project is NOT located within CH AND all of the following apply:
 - is NOT associated with the USFS
 - the action does NOT fall within the boundaries of a LAU⁴
 - has potential to involve indirect³ harm to the species.
- The project is NOT located within CH AND all of the following apply:
 - is NOT associated with the USFS
 - the action does NOT fall within the boundaries of a LAU⁴
 - does NOT have potential to involve indirect³ harm to the species
 - will result to changes to Canada Lynx habitat quality, quantity, or availability⁵ that is greater than 10 acres.
- The project is NOT located in CH AND all of the following apply:
 - will NOT involve direct² harm to Canada Lynx
 - is associated with the USFS
 - the action does NOT comply with the Canada Lynx standards and guidelines outlined in the Forest Plan.⁶
- The project is NOT located in CH AND all of the following apply:
 - does NOT involve direct² harm to Canada Lynx
 - the action falls within the boundaries of a LAU⁴
 - the action is NOT associated with the USFS
 - the action does NOT comply with the Conservation Measures (Chapter 5) in the Canada Lynx Conservation Assessment and Strategy.⁷
- The project is located within CH AND all of the following apply:
 - is NOT associated with the USFS
 - the action does NOT fall within the boundaries of a LAU⁴
 - the action will result in greater than 10 acres of change to Canada Lynx or Snowshoe Hare habitat quality, quantity, or availability.⁵
- The project is located within CH AND all of the following apply:
 - is associated with the USFS
 - the action does NOT comply with the Canada Lynx standards and guidelines outlined in the Forest Plan.⁶

- The project is located within CH AND all of the following apply:
 - the action falls within the boundaries of a LAU²
 - the action does NOT comply with the Conservation Measures (Chapter 5) in the Canada Lynx Conservation Assessment and Strategy.⁷

Canada Lynx References

- MDNR. (2022). *Canada Lynx Lynx canadensis*. Retrieved from <https://www.dnr.state.mn.us/mammals/canadalynx.html#:~:text=The%20Canada%20lynx%20is%20a,of%20deep%2C%20soft%2C%20snows.>
- USFWS. (2000, March 24). *Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for the Contiguous U.S. Distinct Population Segment of the Canada Lynx and Related Rule*. Retrieved from US Federal Register: <https://www.govinfo.gov/content/pkg/FR-2000-03-24/pdf/00-7145.pdf#page=3>
- USFWS. (2005, September 14). *Recovery Outline Contiguous United States Distinct Population Segment of the Canada Lynx*. Retrieved from USFWS ECOS: https://ecos.fws.gov/docs/recovery_plan/final%20draft%20Lynx%20Recovery%20Outline%209-05.pdf
- USFWS. (2014, September 12). *Endangered and Threatened Wildlife and Plants: Revised Designation of Critical Habitat for the Contiguous United States Distinct Population Segment of the Canada Lynx and Revised Distinct Population Segment Boundary*. Retrieved from US Federal Register: <https://www.govinfo.gov/content/pkg/FR-2014-09-12/pdf/2014-21013.pdf#page=1>
- USFWS. (2017a, November 13). *Canada Lynx (Lynx canadensis) 5-Year Review: Summary and Evaluation*. Retrieved from USFWS ECOS: https://ecos.fws.gov/docs/tess/species_nonpublish/2530.pdf
- USFWS. (2017b, October 1). *Species Status Assessment for the Canada Lynx (Lynx canadensis) Contiguous United States Distinct Population Segment Version 1.0 Final*. Retrieved from USFWS ECOS: <https://ecos.fws.gov/ServCat/DownloadFile/213244>
- USFWS. (2021, December 3). *Canada Lynx (Lynx canadensis)*. Retrieved from USFWS Ecosphere: <https://www.fws.gov/media/maine-field-office-canada-lynx-fact-sheet>
- WDNR. (2022). *Furbearers*. Retrieved from <https://dnr.wisconsin.gov/topic/WildlifeHabitat/furbearers.html#:~:text=Canada%20lynx%20are%20federally,tufts%20and%20very%20large%20feet.>

¹NLAA – For projects that reach a “not likely to adversely affect” determination, there is a 30 day “verification period” to allow the USFWS to review the project details and ensure the action meets the criteria for a NLAA determination. Output letters will indicate that if the project proponent does not hear otherwise within that timeframe, the NLAA determination is verified and they can proceed with their action as described in the IPaC report and concurrence verification letter. This verification period allows the USFWS Minnesota Wisconsin Ecological Services Field Office to apply local knowledge to evaluation of the action and ensure actions do not have unanticipated impacts. Thus, there may be a small subset of actions for which the USFWS Minnesota Wisconsin Ecological Services Field Office may request additional information during this timeframe to verify the effects determination reached through the IPaC DKey.

²For example, mammal trapping or poison bait.

³For example, increased vehicle use that may result in vehicle strikes; removal of 10 acres or more of boreal forest or is likely to significantly reduce snowshoe hare density over a 10-acre area.

⁴Lynx Analysis Unit (LAU): <https://www.arcgis.com/apps/mapviewer/index.html?layers=199d84e3e1274640bae19695646a5620>

⁵For example, thinning and/or other timber management and logging practices; residential and commercial development; road, railroad and utility corridors development; mining activities; prescribed fire; trail development; winter activities that compact snow such as winter road use, snowmobiling, cross country skiing, and dog sledding.

⁶U.S. Department of Agriculture 2004 FINAL Forest Plan – Superior National Forest Appendix E – Canada Lynx: https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fsm91_050609.pdf

⁷U.S. Department of Agriculture 2013 Canada Lynx conservation assessment and strategy: https://www.fs.fed.us/biology/resources/pubs/wildlife/LCAS_revisedAugust2013.pdf

⁸May affect – Further consultation with the USFWS Minnesota Wisconsin Ecological Services Field Office is necessary in order to discern if the activity would result in a “no effect”, “not likely to adversely affect”, or “likely to adversely affect” determination.

Appendix 2 – Dakota Skipper (*Hesperia dacotae*)

Dakota Skipper Species Summary

The Dakota Skipper is currently listed by the U.S. Fish and Wildlife Service (USFWS) under the Endangered Species Act (ESA) as ‘threatened’ across its range (USFWS, 2014a). Major threats to the Dakota Skipper are loss and degradation of the remaining patches of its native prairie habitat caused by development (e.g., agriculture, pipelines), secession, invasive species, pesticide use, flooding, and poor land management practices (USFWS, 2021). The USFWS species profile for the Dakota Skipper can be found at <https://ecos.fws.gov/ecp/species/1028>. Additional information can be found at <https://www.fws.gov/species/dakota-skipper-hesperia-dacotae>. A summary of the ecology of this species can be found in the USFWS Dakota Skipper recovery plan (USFWS, 2021), the most recent 5-year review (USFWS, 2019), and the current Species Status Assessment (USFWS, 2018). A 4(d) rule has been established for the Dakota Skipper (USFWS, 2014a).

Dakota Skipper Biological Information

The Dakota Skipper is a small butterfly with a 1-inch wingspan (**Figure 1**). Like other skippers, it has a thick body and a faster, more powerful flight than most butterflies. The upper side of the male’s wing is tawny-orange to brown with a prominent mark on the forewing (**Figure 2**); the lower surface is dusty yellow-orange. The upper side of the female’s wing is darker brown with tawny-orange spots and a few white spots on the forewing margin; the lower side is gray-brown with a faint white spot band across the middle (USFWS, 2014b).



Figure 1. *The Dakota Skipper* (Phil Delphey, USFWS)

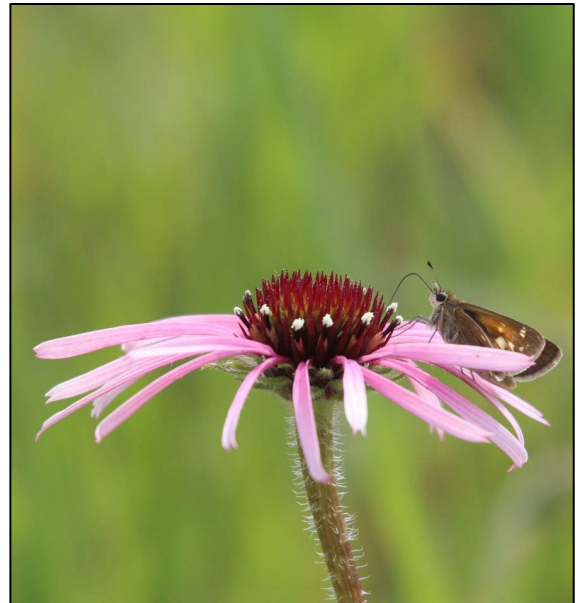


Figure 2. *The Dakota Skipper* (USFWS)

Dakota Skippers have 4 basic life stages: egg, larva, pupa and adult. During the brief adult period in June and July, females lay eggs on the underside of leaves. Eggs take about 10 days to hatch into larvae

(caterpillar). Dakota Skipper spend most of their lifespan in the larval stage (USFWS, 2017). After hatching, larvae build shelters at or below the ground surface and emerge at night to feed on grass or leaves. This continues until fall when larvae become dormant. They overwinter in solitary shelters at or just below ground level, usually in the base of native bunchgrasses (Dana, 1991). The following spring, larvae emerge to continue developing. Pupation takes about 10 days and usually happens in June (USFWS, 2014b). Dakota Skipper pupae are reddish-brown, and the larvae are light brown with a black collar and dark brown head with early instars being described as green with dark head and collar (**Figures 3 and 4**) (USFWS, 2018).



Figure 3. Dakota Skipper larvae emerging from egg (Minnesota Zoo)



Figure 4. Dakota Skipper larva (Minnesota Zoo)

Adult males emerge from pupae about five days before females, and the adults live for a maximum of 3 weeks (middle of June to the end of July). This brief period is the only time that Dakota Skippers can reproduce. If a female Dakota Skipper lives for the full 3 weeks and adequate flowers for nectar are available, she may lay up to 250 eggs which are matured at a declining rate over the 3-week span (Dana, 1991).

Native prairie nectar sources, providing both water and food, are crucial for survival of both sexes during the adult flight period, which often occurs during the hottest part of summer (USFWS, 2014b). Flowering herbaceous plants (native forbs), primarily the Purple Coneflower (Dana, 1991), must be available in sufficient quantity and proximity to suitable larval habitats to provide for the Dakota Skipper during the summer flight period.

Dakota Skipper Suitable Habitat

The Dakota Skipper inhabits remnants of mixed and tallgrass prairie (USFWS, 2021). The species relies on high quality habitat conditions – diverse native grassland plant communities – and on natural or human disturbance to maintain these communities. Disturbance may include grazing, haying, burning, pesticide use, and (lack of) land management practices (USFWS, 2021). Dakota Skippers do not live on non-native grasslands, weedy roadsides, tame hayland, or cropland that has been replanted to native prairie (USFWS, 2018).

Dakota Skipper habitat is comprised of 2 general types (Type A and Type B). Type A is a low-mesic prairie with little topographic relief that occurs on near-shore glacial lake deposits in the Dakotas and Canada.

This habitat type is dominated by bluestem grasses, with Wood Lily, Bluebell Bellflower, and Mountain Deathcamas almost always present (USFWS, 2018).

Type B habitat, which occurs in Minnesota, is primarily found on rolling terrain over gravelly glacial moraine deposits, and is dominated by Big Bluestem, Little Bluestem, and needle or porcupine grasses (**Figure 5**). In Minnesota, many historically occupied sites (and one currently occupied) are shoreline complexes created by glacial Lake Agassiz and consist of low, variably broad ridges or scarps of sandy-gravelly soil supporting mesic to dry prairie (predominantly dry-mesic) with no flooding susceptibility.

Most nectaring in Minnesota occurs in dry-mesic habitat (USFWS, 2018). Primary nectar sources (Type B habitat) are Purple Coneflower, Hoary Vervain, Purple Locoweed, Big Bluestem, Little Bluestem, and needle-and-thread or porcupine grasses. Oval-leaf Milkweed and Prairie Milkvetch are also used. In addition to those listed, Type B habitat typically supports a high diversity and abundance of native forbs, including Purple Prairie Clover White Prairie Clover, Yellow Sundrops, Prairie Groundsel, Groundplum Milkvetch, Eastern Pasqueflower, Old Man's Whiskers (Prairie Smoke), Western Silver Aster, Dotted Blazing Star, Tall Blazing Star, Meadow Zizia (Heartleaf Golden Alexanders), Blanket Flower and Prairie Sagewort, Leadplant. As in Type A habitats, Bluebell Bellflower and Prairie Lily are present, but Type B habitats also typically support extensive stands of Purple Coneflower, Upright Prairie Coneflower, and Common Gaillardia (Blanketflower) (**Figure 6**) (USFWS, 2018).

Dakota Skipper has low mobility and may not be capable of moving more than 0.6 miles (1 kilometer) (USFWS, 2017). Discrete populations have been recorded in remnant prairie patches as small as 1 acre (0.4 hectares), but this type of population is likely to rely heavily on the existence of populations in nearby patches for their continued existence (USFWS, 2019).



Figure 5. Type B Dakota Skipper prairie habitat (USFWS)



Figure 6. Purple Coneflower in upland prairie (Laura Hubers, USFWS)

The historical range of the Dakota Skipper extended from Illinois to southeastern Saskatchewan and Manitoba. Currently, the Dakota Skipper occurs within the United States only in Minnesota, North Dakota, and South Dakota (Royer, McKenney, & Newton, 2008).

Dakota Skipper Critical Habitat

Critical habitat was designated for the Dakota Skipper in 2015 (USFWS, 2015). Critical habitat for Dakota Skipper consists of 3 biological and physical features (e.g., Primary Constituent Elements).

(1) Wet-mesic tallgrass or mixed-grass remnant untilled prairie that occurs on near-shore glacial lake soil deposits or high-quality dry-mesic remnant untilled prairie on rolling terrain consisting of gravelly glacial moraine soil deposits, containing: a. A predominance of native grasses and native flowering forbs, b. Glacial soils that provide the soil surface or near surface (between soil surface and 2 cm depth) microclimate conditions conducive to Dakota Skipper larval survival and native prairie vegetation, c. If present, trees or large shrub cover of less than 5 percent of area in dry prairies and less than 25 percent in wet-mesic prairies; and d. If present, nonnative invasive plant species occurring in less than 5 percent of area.

(2) Native grasses and native flowering forbs for larval and adult food and shelter, specifically: a. At least one of the following native grasses to provide larval food and shelter sources during Dakota Skipper larval stages: Prairie Dropseed or Little Bluestem; and b. One or more of the following forbs in bloom to provide nectar and water sources during the Dakota Skipper flight period: Purple Coneflower, Bluebell Bellflower, White Prairie Clover, Upright Prairie Coneflower, Fleabane, Blanketflower Black-eyed Susan, Yellow Sundrops, Prairie Milkvetch, or Common Gaillardia.

(3) Dispersal grassland habitat that is within 0.6 mi (1 km) of native high-quality remnant prairie (as defined in Primary Constituent Element 1) that connects high-quality wet-mesic to dry tallgrass prairies or moist meadow habitats. Dispersal grassland habitat consists of undeveloped open areas dominated by perennial grassland with limited or no barriers to dispersal including tree or shrub cover less than 25 percent of the area and no row crops such as corn, beans, potatoes, or sunflowers (USFWS, 2015).

Dakota Skipper Determination Key Guidance

The proposed action is the compilation of many different types of projects that, depending on their size and specific location, often do not significantly affect any Federally listed threatened or endangered species or critical habitats in Minnesota and Wisconsin. Common project types include, but are not limited to, the following:

- Vegetation management, including mowing, forestry activities, prescribed burning, and harvest
- Construction, maintenance, operation, and/or removal of:
 - Roads/trails
 - Communication towers
 - Transmission/utility lines
 - Bridges/culverts
 - Oil/gas pipelines
 - Solar power facilities
 - Hydroelectric facilities/ dams
 - Mines/quarries
 - Canals/levees/dikes
- Commercial/residential/recreational developments
- Agricultural activities
- Site/habitat restoration/enhancement

- Shoreline protection/beach nourishment
- Dredging and filling of wetlands/waterbodies
- Military operations

Exempt Activities 4(d) rule

The Dakota Skipper listing includes a 4(d) rule that acknowledges the positive role that some ranchers are taking in managing Dakota Skipper habitat, even though the ranching activities may result in incidental take. There are 7 exempt activities. The following must be on non-federal land and associated with livestock ranching:

- Fence construction and maintenance
- Installation and maintenance of corrals, loading chutes, and other livestock working facilities
- Development and maintenance of livestock watering facilities
- Spot-spraying herbicides for noxious weed control and mowing to control noxious weeds
- Haying of native haylands after July 15

Projects that are not associated with livestock ranching but are also exempt under the 4(d) rule include mowing of section line rights-of-way and recreational trails.

No Effect

Projects that are outside of the Dakota Skipper species list area OR outside of Dakota Skipper suitable habitat¹ will result in a No Effect (NE)² determination.

Not Likely to Adversely Affect

Projects that intersect the Dakota Skipper species list area may result in a Not Likely to Adversely Affect (NLAA)³ determination if:

- The action occurs in suitable habitat¹ AND all the following apply:
 - surveys⁴ for Dakota Skipper were conducted according to FWS approved protocols
 - AND
 - Dakota Skippers were NOT observed.
- The action occurs in suitable habitat¹ or critical habitat (CH) AND all of the following apply:
 - surveys⁴ for Dakota Skipper were conducted according to FWS approved protocols AND Dakota Skippers were observed
 - the action will NOT disturb the ground or existing vegetation⁵
 - the action does NOT include application of insecticides
 - the action will NOT result in changes to Dakota Skipper habitat quality, quantity, or availability.⁶

May Affect

Projects that intersect Dakota Skipper species list area or CH may result in a May Affect (MA)⁷ determination if any of the following occurs in suitable habitat¹ AND the action:

- is on Federal land,
- will result in changes to Dakota Skipper habitat quality, quantity, or availability,⁶
- will disturb the ground or existing vegetation,⁴
- OR
- includes application of insecticides.

Dakota Skipper References

- Dana, R. P. (1991). Conservation Management of the Prairie Skippers *Hesperia dacotae* and *Hesperia ottoe*. *Station Bulletin 594-1991*.
- Royer, R. A., McKenney, R. A., & Newton, W. E. (2008). A Characterization of Non-Biotic Environmental Features of Prairies Hosting the Dakota Skipper (*Hesperia dacotae*) Across its Remaining U.S. Range. *Journal of The Lepidopterists' Society*, 1-17.
- USFWS. (2014a, October 24). *Endangered and Threatened Wildlife and Plants; Threatened Species Status for Dakota Skipper and Endangered Species Status for Poweshiek Skipperling*. Retrieved from US Federal Register: <https://www.govinfo.gov/content/pkg/FR-2014-10-24/pdf/2014-25190.pdf#page=1>
- USFWS. (2014b, October). *Dakota Skipper (Hesperia dacotae)*. Retrieved from Midwest Region Endangered Species: <https://www.fws.gov/midwest/endangered/insects/dask/daskFactSheet.html>
- USFWS. (2015, October 1). *Endangered and Threatened Wildlife and Plants: Designation of Critical Habitat for the Dakota Skipper and Poweshiek Skipperling*. Retrieved from US Federal Register: <https://www.govinfo.gov/content/pkg/FR-2015-10-01/pdf/2015-24184.pdf#page=1>
- USFWS. (2016a, May). *USFWS Midwest Region Endangered Species Dakota Skipper (Hesperia dacotae)*. Retrieved from Dakota Skipper Conservation Guidelines: <https://www.fws.gov/midwest/endangered/insects/dask/pdf/DakotaSkipperConservationGuidelines2016Update.pdf>
- USFWS. (2016b, May). *Guidance for Interagency Cooperation under Section 7(a)(2) of the Endangered Species Act for the Dakota Skipper, Dakota Skipper Critical Habitat, and Poweshiek Skipperling Critical Habitat Version 1.1*. Retrieved from Midwest Region Endangered Species: <https://www.fws.gov/midwest/endangered/insects/dask/pdf/DakotaSkipperS7GuidanceV1.1.pdf>
- USFWS. (2017, February 16). Intra-Service Section 7 Consultation of Region 3's and Region 6's Proposal to Issue a Section 10(a)(1)(A) Permit to The Nature Conservancy. *Biological Opinion Section 10 for the Dakota skipper*. Twin Cities and South Dakota Ecological Services Field Offices: USACE.
- USFWS. (2018, September 1). *Dakota Skipper (Hesperia dacotae) Report on the Species Status Assessment Version 2 - September 2018*. Retrieved from USFWS ECOS: <https://ecos.fws.gov/ServCat/DownloadFile/155865>
- USFWS. (2019, September 17). *Dakota skipper (Hesperia dacotae) 5-Year Review: Summary and Evaluation*. Retrieved from USFWS ECOS: https://ecos.fws.gov/docs/tess/species_nonpublish/2816.pdf
- USFWS. (2021, September 28). *Recovery Plan for Dakota skipper (Hesperia dacotae)*. Retrieved from USFWS ECOS: https://ecos.fws.gov/docs/recovery_plan/Dakota%20Skipper%20Final%20Recovery%20Plan_28September2021_508.pdf

¹Dakota skipper habitat found in Minnesota occurs primarily on remnant prairie with rolling terrain and is dominated by Big Bluestem, Little Bluestem, and needle or porcupine grasses. It typically supports a high diversity and abundance of native forbs, including Purple Coneflower, Purple Prairie Clover, White Prairie Clover, Yellow Sundrops, Prairie Groundsel, Groundplum Milkvetch, Eastern Pasqueflower, Old Man's Whiskers, Western Silver Aster, Dotted Blazing Star, Tall Blazing Star, Meadow Zizia, Blanket Flower, Prairie Sagewort, Leadplant, and Prairie Milkvetch.

²No effect – The proposed project would result in no effect to this species and/or its federally designated critical habitat (if applicable). Further consultation with the USFWS Minnesota Wisconsin Ecological Services Field Office is not necessary for the project as described.

³NLAA – For projects that reach a “not likely to adversely affect” determination, there is a 30 day “verification period” to allow the USFWS to review the project details and ensure the action meets the criteria for a NLAA determination. Output letters will indicate that if the project proponent does not hear otherwise within that timeframe, the NLAA determination is verified and they can proceed with their action as described in the IPaC report and concurrence verification letter. This verification period allows the USFWS Minnesota Wisconsin Ecological Services Field Office to apply local knowledge to evaluation of the action and ensure actions do not have unanticipated impacts. Thus, there may be a small subset of actions for which the USFWS Minnesota Wisconsin Ecological Services Field Office may request additional information during this timeframe to verify the effects determination reached through the IPaC DKey.

⁴2018 Dakota Skipper (*Hesperia dacotae*) North Dakota Survey Protocol can be accessed at <https://www.fws.gov/midwest/endangered/insects/dask/pdf/2018DASKSurveyProtocol4202018.pdf>

⁵This includes any off-road vehicle access, soil compaction, digging, seismic survey, directional drilling, heavy equipment, grading, trenching, placement of fill, pesticide application (herbicide, fungicide), vegetation management (including removal or maintenance using equipment or prescribed fire), cultivation, development, etc.

⁶This includes land management activities such as haying, grazing, and prescribed fire; governmental, commercial, or private development; agricultural conversion; allowing habitat to convert to brush or trees; application of pesticides, including herbicide, insecticide, or fungicide, etc.

⁷May affect – Further consultation with the USFWS Minnesota Wisconsin Ecological Services Field Office is necessary in order to discern if the activity would result in a “no effect”, “not likely to adversely affect”, or “likely to adversely affect” determination.

Appendix 3 – Dwarf Lake Iris (*Iris lacustris*)

Dwarf Lake Iris Species Summary

The Dwarf Lake Iris is currently listed by the U.S. Fish and Wildlife Service (USFWS) under the Endangered Species Act (ESA) as ‘threatened’ across its range (USFWS, 1988). Threats to The Dwarf Lake Iris are accelerating due to shoreline development for residential and vacation homes and associated road-widening, chemical spraying, salting, and off-road vehicle usage (USFWS, 2019). The USFWS species profile for the Dwarf Lake Iris can be found at <https://ecos.fws.gov/ecp/species/598>. Additional information can be found at <https://fws.gov/species/dwarf-lake-iris-iris-lacustris>. A summary of the ecology of this species can be found in the USFWS Dwarf Lake Iris recovery plan (USFWS, 2013) and most recent 5-year review (USFWS, 2022). No critical habitat has been designated for this species.

Dwarf Lake Iris Biological Information

Dwarf Lake Iris is a low-growing perennial plant with slender, creeping rhizomes and flattened, sword-like leaves approximately 6 inches (16 centimeters (cm)) or less in height during the blooming period (**Figure 1**). The blue to purple-colored flowers are borne singly on short flowering stalks up to 1.5 inches (4 cm) long with 1 to 3 reduced leaves at the base. The flowers, which emerge primarily from mid to late-May, have 3 petal-like recurving sepals that are beardless and covered with whitish, multi-ridged crests splotched with yellow. Overarching each sepal and stamen is a petal-like style branch with an upturned tip. On its underside each style branch bears a thin, delicate, flap-like lip that comprises the stigmatic surface. Alternating with the sepals are 3 smaller, paler blue, erect petals. In full bloom, Dwarf Lake Iris flowers are approximately 1 to 1.5 inches (2.5 to 4 cm) wide and 1.5 to 2.4 inches (4 to 6 cm) in height. Flowers are most commonly blue but may vary from pale to somewhat darker lilac shades (**Figure 2**); albino flowers occur sporadically throughout the range of the species.

Dwarf Lake Iris fruits are rounded capsules about 0.5 inches (1.2 cm) long, bearing 20-22 brown, oval seeds with a shiny white, coiling appendage that may function as an elaiosome (foodbody) to attract potential seed dispersers such as ants (*Formica* spp.) (USFWS, 2013; USFWS, 2022). Dwarf Lake Iris seeds may be dormant for several years while maintaining viability (USFWS, 2011).

The leaves and rhizomes of Dwarf Lake Iris can be identified throughout the growing season, and in combination with habitat information can be used fairly reliably to detect this species. It is easiest to detect during the flowering period (USFWS, 2019). The optimal identification period for Dwarf Lake Iris is late May through early July (WDNR, 2021).



Figure 1. Dwarf Lake Iris (USFWS, 2013)



Figure 2. Dwarf Lake Iris (USFWS, 2011)

Dwarf Lake Iris Suitable Habitat

Dwarf Lake Iris occurs close to Great Lakes shorelines in cool, moist lakeshore air. Dwarf lake Iris grows in colonies in shallow soil over moist calcareous sands, gravel and beach rubble (**Figure 3**). Habitat is along old beach ridges or behind open dunes. Changing water levels can open new habitat for the plants.

Sunlight is critical to the growth and reproduction of the species and partly shaded or sheltered forest edges are optimal for sexual reproduction, although the species tolerates nearly full shade to open sun. Some form of disturbance is required to maintain the forest openings that provide these partial shade conditions (USFWS, 2013). Leaf litter depth and type influence vegetative growth, sexual reproduction, seed germination and seedling establishment (USFWS, 2011).

Dwarf Lake Iris grows primarily along the edges of shoreline boreal forests in close association with or proximity to other rare coastal species, such as Houghton's Goldenrod, Pitcher's Thistle, Piping Plover, and the Lake Huron Locust. The species is often associated with shoreline coniferous forests dominated by Northern White Cedar and Balsam Fir (USFWS, 2013).



Figure 3. Dwarf Lake Iris suitable habitat includes cobble beach habitat on Lake Michigan (U.S. Forest Service, 2021)

In Wisconsin, Dwarf Lake Iris is restricted to Door, Kewaunee, and Brown counties. Suitable habitat in these counties differs considerably. Occurrences in Door County are near Lake Michigan and occupy relatively open sites with cobblestone habitat that dominates these lakeshore areas. Nearly all colonies in Door County occur at elevations below 600 feet (183 m) on the lakeplain covered 3,000 to 4,000 years ago by glacial Lake Nipissing. Occurrences in Brown County often exist in the deep shade of mature cedar or mixed cedar/hardwood forests. Brown County populations occur 700 to 800 feet (213 to 244 m) above sea level, along probable shorelines and drainage channels of preglacial Lake Oshkosh (USFWS, 2013). Remaining Dwarf Lake Iris populations in Wisconsin are found on a mix of public and private lands (USFWS, 2011).

Dwarf Lake Iris Critical Habitat

Critical habitat has not been designated for the Dwarf Lake Iris.

Dwarf Lake Iris Determination Key Guidance

The proposed action is the compilation of many different types of projects that depending on their size and specific location often do not significantly affect any Federally listed threatened or endangered species or critical habitats in Minnesota and Wisconsin. Common project types include, but are not limited to, the following:

- Vegetation management, including mowing, forestry activities, prescribed burning, and harvest
- Construction, maintenance, operation, and/or removal of:
 - Roads/trails
 - Communication towers
 - Transmission/utility lines
 - Bridges/culverts
 - Oil/gas pipelines
 - Solar power facilities
 - Hydroelectric facilities/ dams
 - Mines/quarries

- Canals/levees/dikes
- Commercial/residential/recreational developments
- Agricultural activities
- Site/habitat restoration/enhancement
- Shoreline protection/beach nourishment
- Dredging and filling of wetlands/waterbodies
- Military operations

No Effect

Projects that intersect the Dwarf Lake Iris species list area may result in a No Effect (NE)¹ determination if both of the following apply:

- A survey was completed, and the Dwarf Lake Iris was not detected.
 - Upload the survey results to IPaC. If unable to upload the survey to IPaC, email the survey results to the MNWI ES Field Office (TwinCities@fws.gov).
- The action area occurs in unsuitable habitat.

Not Likely to Adversely Affect

Projects that intersect the Dwarf Lake Iris species list area may result in a Not Likely to Adversely Affect (NLAA)² determination if:

- Restrictions on stream/hydrology-impacting or vegetation/ground-disturbing activities within the species list area/buffered habitat. Restrictions include actions that are likely to change the elevations of surface water upstream or downstream, or in the local groundwater (as estimated pre-action vs. post-action); as well as the potential to impact the riparian zone (up to 200 feet) or indirectly impact a stream or river (e.g., cut and fill, horizontal directional drilling, construction, vegetation removal, pesticide or fertilizer application, discharge, runoff of sediment or pollutants, increase in erosion).
- Restrictions on actions that may fragment habitat or create barriers to movement/dispersal within the species list area

May Affect

Projects that intersect Dwarf Lake Iris species list area and have either determined presence through a survey or have not conducted a survey will result in a May Affect (MA)³ determination if any of the following occurs:

- Suitable habitat is present
- Suitable habitat is present in the surrounding area
- There are known elemental occurrences⁴ in the action area/surrounding area
- There is evidence of habitat fragmentation in the action area/surrounding area
- The action occurs during flowering season
- Wetland delineation or habitat assessment/survey suggest presence of the species
- The species is observed during a site visit or there are reports of presence
- Disturbance of the ground or existing vegetation⁵
- Indirect alteration of the habitat or resources of the listed plant(s)⁶
- Direct harm to the listed plant(s)⁷

Dwarf Lake Iris References

- Penskar, M., Crispin, S., & Higman, P. (2001). *Species Account for Iris lacustris (dwarf lake iris)*. Lansing, MI: Michigan Natural Features Inventory.
- U.S. Forest Service. (2021). *Dwarf Lake Iris (Iris lacustris Nutt.)*. Retrieved from Plant of the Week: https://www.fs.fed.us/wildflowers/plant-of-the-week/iris_lacustris.shtml
- USFWS. (1988, September 28). *Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for Iris lacustris (Dwarf Lake Iris)*. Retrieved from US Federal Register: <https://www.govinfo.gov/content/pkg/FR-1988-09-28/pdf/FR-1988-09-28.pdf#page=254>
- USFWS. (2011, August 4). *Dwarf Lake Iris (Iris lacustris) 5-Year Review: Summary and Evaluation*. Retrieved from USFWS ECOS: https://ecos.fws.gov/docs/tess/species_nonpublish/1730.pdf
- USFWS. (2013, August 1). *Dwarf Lake Iris (Iris lacustris) Recovery Plan*. Retrieved from USFWS ECOS: https://ecos.fws.gov/docs/recovery_plan/DLI%20RP%20FINAL%20AUG2013_1.pdf
- USFWS. (2019, May 29). *Dwarf Lake Iris Factsheet*. Retrieved from Midwest Region Endangered Species: <https://www.fws.gov/midwest/endangered/plants/dwarflakeiris/dwarflak.html>
- USFWS. (2021). *MN WI DKey Standing Analysis Draft*.
- USFWS. (2022, January 18). *Dwarf Lake Iris (Iris lacustris) 5-Year Review*. Retrieved from USFWS ECOS: https://ecos.fws.gov/docs/tess/species_nonpublish/3645.pdf
- WDNR. (2021, May 5). *Life History*. Retrieved from Dwarf Lake Iris (Iris lacustris): <https://dnr.wi.gov/topic/EndangeredResources/Plants.asp?mode=detail&SpecCode=PMIRI090H0>

¹No effect – The proposed project would result in no effect to this species and/or its federally designated critical habitat (if applicable). Further consultation with the USFWS Minnesota Wisconsin Ecological Services Field Office is not necessary for the project as described.

²NLAA – For projects that reach a “not likely to adversely affect” determination, there is a 30 day “verification period” to allow the USFWS to review the project details and ensure the action meets the criteria for a NLAA determination. Output letters will indicate that if the project proponent does not hear otherwise within that timeframe, the NLAA determination is verified and they can proceed with their action as described in the IPaC report and concurrence verification letter. This verification period allows the USFWS Minnesota Wisconsin Ecological Services Field Office to apply local knowledge to evaluation of the action and ensure actions do not have unanticipated impacts. Thus, there may be a small subset of actions for which the USFWS Minnesota Wisconsin Ecological Services Field Office may request additional information during this timeframe to verify the effects determination reached through the IPaC DKey.

³May affect – Further consultation with the USFWS Minnesota Wisconsin Ecological Services Field Office is necessary in order to discern if the activity would result in a “no effect”, “not likely to adversely affect”, or “likely to adversely affect” determination.

⁴Elemental occurrence data can be accessed from the Wisconsin Natural Heritage Inventory: <https://dnr.wisconsin.gov/topic/NHI> and the Minnesota Department of Natural Resources Natural Heritage Information System: <https://www.dnr.state.mn.us/nhnrp/nhis.html>

⁵This includes any off-road vehicle access, soil compaction, digging, seismic survey, directional drilling, heavy equipment, grading, trenching, placement of fill, pesticide application (herbicide, fungicide), vegetation management (including removal or maintenance using equipment or chemicals), cultivation, development, etc.

⁶For example, actions that cause a change in canopy cover, microclimate, humidity, increase in invasive species, hydrologic alterations, etc.

⁷For example, through prescribed fire, herbicide application, trampling, increased herbivory, cutting/clearing, cultivation, crushing by vehicle, reduction to possession, etc.

Appendix 4 – Eastern Massasauga Rattlesnake (*Sistrurus catenatus*)

Eastern Massasauga Rattlesnake Species Summary

The Eastern Massasauga Rattlesnake is currently listed by the U.S. Fish and Wildlife Service (USFWS) under the Endangered Species Act (ESA) as ‘threatened’ across its range (USFWS, 2016a). Habitat loss and fragmentation of wetlands from development and vegetative succession (i.e., invasion of woody species) are the most prevalent threats (USFWS, 2021a). The USFWS species profile for the Eastern Massasauga Rattlesnake can be found at <https://ecos.fws.gov/ecp/species/2202>. Additional information can be found at <https://www.fws.gov/media/eastern-massasauga-rattlesnake>. A summary of the ecology of this species can be found in the USFWS Eastern Massasauga Rattlesnake recovery plan (USFWS, 2021a), the most recent 5-year review (USFWS, 2021b) and the current Species Status Assessment (USFWS, 2016b). No critical habitat has been designated for this species.

Eastern Massasauga Rattlesnake Biological Information

Eastern Massasauga Rattlesnakes are small snakes with thick bodies, heart-shaped heads and vertical pupils. The average length of an adult is about 2 feet (61 centimeters). Adult Eastern Massasauga Rattlesnakes are gray or light brown with large, light-edged chocolate brown blotches on the back and smaller blotches on the sides (**Figure 1**). The ventral portion of the snake's body is marbled dark gray or black and with a narrow, white stripe on its head. Its tail has several dark brown rings and is tipped by gray-yellow horny rattles. Juvenile Eastern Massasauga Rattlesnakes have the same markings as adults but are more vividly colored. Other snakes similar in appearance include Fox Snake, Milk Snake, and Hognose Snake (USFWS, 2016c).

Eastern Massasauga Rattlesnakes primarily eat small rodents, such as mice and voles, but may also supplement their diet with frogs and other snakes. They hunt by sitting and waiting. Heat-sensitive pits near the snake's eyes alert the snake to the presence of prey.

Eastern Massasauga Rattlesnakes are viviparous and bear live young. Depending on their health, adult females may bear young every year or every other year. When food is especially scarce, they may only produce offspring every 3 years. Most Eastern Massasauga Rattlesnakes mate in late summer (primarily in August) and give birth approximately 1 year later. Litter size varies from 5 to 20 young.



Figure 1. Eastern Massasauga Rattlesnake (USFWS, 2021a)

Eastern Massasauga Rattlesnake Suitable Habitat

Eastern Massasauga Rattlesnakes live in wet areas, including wet prairies, marshes, fens, sedge meadows, peatlands, and low areas along rivers and lakes (**Figure 2**). They are strongly associated with floodplain habitats along medium to large rivers, especially near river confluences (WDNR, 2020). They also use adjacent uplands (shrubland, open woodlands, prairie) during part of the year. Eastern Massasauga Rattlesnakes hibernate below the frostline in crayfish or small mammal burrows, tree root networks or rock crevices in areas where the water table is near the surface (areas where the soil is saturated but not inundated) and with consistent hydrology to support overwinter survival. Hibernacula are typically near wetland edges, or slightly upland (typically within 1,640 feet [500 meters] of regulated wetland). Eastern Massasauga Rattlesnakes stay in the area around their hibernacula until overnight temperatures warm up enough for them to move to their active seasonal range.

Eastern Massasauga Rattlesnakes usually begin to emerge in early April from their overwintering habitats and remain active until mid-November, depending on air temperatures (WDNR, 2020). The species hibernates alone. The Eastern Massasauga Rattlesnake is highly cryptic in nature and can persist in low densities, which makes them difficult to detect.



Figure 2. *Eastern Massasauga Rattlesnake habitat* (Richard Staffen, WDNR)

Eastern Massasauga Rattlesnake Critical Habitat

Critical habitat has not been designated for the Eastern Massasauga Rattlesnake.

Eastern Massasauga Rattlesnake Determination Key Guidance

The proposed action is the compilation of many different types of projects that, depending on their size and specific location, often do not significantly affect any federally listed threatened or endangered species or critical habitats in Minnesota and Wisconsin. Common project types include, but are not limited to, the following:

- Vegetation management, including mowing, forestry activities, prescribed burning, and harvest
- Construction, maintenance, operation, and/or removal of:
 - Roads/trails
 - Communication towers
 - Transmission/utility lines
 - Bridges/culverts
 - Oil/gas pipelines
 - Solar power facilities
 - Hydroelectric facilities/ dams
 - Mines/quarries
 - Canals/levees/dikes
- Commercial/residential/recreational developments
- Agricultural activities
- Site/habitat restoration/enhancement
- Shoreline protection/beach nourishment
- Dredging and filling of wetlands/waterbodies
- Military operations

Best Management Practices (BMPs) Required

For all projects within the species list area, projects must include all general BMPs as follows:

- Use wildlife-safe materials¹ for erosion control and site restoration throughout the project area. Do not use erosion control products containing plastic mesh netting or other similar material that could entangle the Eastern Massasauga Rattlesnake. Several products for soil erosion and control exist that do not contain plastic netting including net-less erosion control blankets (for example, made of excelsior), loose mulch, hydraulic mulch, soil binders, unreinforced silt fences, and straw bales. Others are made from natural fibers (such as jute) and loosely woven together (often referred to as “leno weave”) in a manner that allows wildlife to wiggle free.
- During project implementation, require reporting of any federally listed species, including the Eastern Massasauga Rattlesnake, to the USFWS within 24 hours.

If conducting ground-disturbing work in Eastern Massasauga Rattlesnake habitat, the following BMPs must be implemented (if applicable):

- Use existing roads and minimize speeds at facilities and access roads (e.g., <15 miles per hour on two-track roads), during the active (April through November) season.
- Use hand cut or low impact harvest methods in suitable habitat including low impact equipment such as lightweight track-mounted vehicles with low ground pressure. Or limit vehicle use to the inactive season (December through March) when the ground is completely frozen.
- Avoid removing or maintaining vegetation (e.g., cutting brush, mowing, applying herbicides).
- Avoid pesticide application.
- Revegetate all disturbed areas with appropriate plant species.² Monitor all restoration plantings for proper establishment and implement supplemental plantings as necessary to ensure restorations are of equal to or better habitat quality than previous conditions.
- Avoid the spread of invasive species into suitable Eastern Massasauga Rattlesnake habitat by following best practices such as inspecting and cleaning equipment and vehicles for invasive plant materials and seeds before entering Eastern Massasauga Rattlesnake habitat areas.
- Ensure fill is clean and free of contaminants/invasive species.

For projects during the active season,³ the following BMPs must be implemented (if applicable):

- For projects involving earthwork, properly install exclusionary fencing, clear the area before work begins using a qualified person, and remove all fencing following project completion.
- Keep turf grass short (<6 inches) throughout the active season.³ In non-turf grass, mow tall (>6 inches) vegetation during the inactive season⁴ or raise the deck height to greater than 8 inches.

For projects using chemical treatments (e.g., herbicides), they must agree to follow all appropriate label instructions regarding which herbicide formulation and proper use in potential Eastern Massasauga Rattlesnake habitat AND avoid spray drift beyond the target species/area (observing label instructions regarding optimal wind speed and direction, boom height, droplet size calibration, precipitation forecast, etc.).

*Based on implementation of the above recommended BMPs, and avoidance of the excluded actions (see Consultation Required activities below), adverse effects to the Eastern Massasauga Rattlesnake are expected to be discountable. **If the BMPs are not met, projects may result in consultation.***

No Effect

Projects that are outside of the Eastern Massasauga Rattlesnake species list area OR are outside of Eastern Massasauga Rattlesnake suitable habitat⁶ will result in a No Effect (NE)⁷ determination.

Not Likely to Adversely Affect

Projects that intersect the Eastern Massasauga Rattlesnake species list area may result in a Not Likely to Adversely Affect (NLAA)⁸ determination if the action occurs in suitable habitat and:

Option A

- Will NOT permanently affect local hydrology
 - AND
- Will NOT involve prescribed fire
 - AND
- Will NOT disturb the ground or existing vegetation
 - AND
- Will use wildlife-safe materials¹ for erosion control and site restoration and eliminate the use of erosion control products containing plastic mesh netting or other similar materials that could ensnare the Eastern Massasauga Rattlesnake
 - AND
- All disturbed areas will be revegetated with appropriate plant species² at the conclusion of the project
 - AND
- All restoration plantings will be monitored for proper establishment
 - AND
- Supplemental plantings will be implemented as necessary to ensure restorations are of equal to or better habitat quality than previous conditions
 - AND
- The spread of invasive species into suitable Eastern Massasauga Rattlesnake will be avoided by following BMPs such as inspecting and cleaning equipment and vehicles for invasive plant materials and seeds before entering Eastern Massasauga Rattlesnake habitat areas
 - AND
- Occurs entirely in upland habitat
 - AND
- Will take place entirely in the Eastern Massasauga Rattlesnake INACTIVE season⁴.

Option B

- Meets criteria 1 through 9 in Option A
 - AND
- Will take place entirely or in part in the Eastern Massasauga Rattlesnake ACTIVE season
 - AND
- Exclusionary fencing will be properly installed and maintained to exclude the Eastern Massasauga Rattlesnake from the area of disturbance during the active season³
 - AND
- The project area will be cleared by a qualified person prior to beginning work
 - AND
- All fencing will be promptly removed at the conclusion of the work
 - AND
- If placing fill, is it ensured that all fill material is free from contaminants and/or invasive species

- AND
- Vehicle speeds will be minimized on roads⁹
 - AND
- Low-impact equipment such as lightweight track-mounted vehicles with low ground pressure will be used
 - AND
- Operating vehicles and/or equipment will be limited to the inactive season when the ground is frozen
 - AND
- Will NOT involve removing or maintaining vegetation.¹⁰

Option C

- Meets criteria 1 through 9 in Option A and 12 through 18 in Option B
 - AND
- Will involve removing or maintaining vegetation¹⁰
 - AND
- Mowing is part of the proposed action
 - AND
- Tall grass (> 6 inches) will be mowed¹⁰ during the inactive season⁴
 - AND
- Mower decks will be raised above 8 inches for non-turf grass¹¹
 - AND
- Turf grass¹⁰ less than 6 inches will be maintained throughout the active season³
 - AND
- Hand cutting or low impact harvest methods will be used
 - AND
- Does NOT involve pesticide application.

Option D

- Meets criteria 1 through 9 in Option A, 12 through 18 in Option B, and 20 through 26 in Option C
 - AND
- Involves pesticide application
 - AND
- All appropriate label instructions regarding the appropriate herbicide or other pesticide formulation and its proper use will be followed
 - AND
- Spray drift beyond the target species/area will be avoided.

Consultation Required

Contact the USFWS regarding the potential applicability of surveys¹² to determine Eastern Massasauga Rattlesnake absence in suitable habitat. The following projects are not covered by the DKey:

- Prescribed fire¹³
- Projects that permanently alter hydrology (during the active³ or inactive season⁴)
- Projects that occur in occupied wetland habitat

Projects that include mowing vegetation (non-turf grass) during the active season³

Eastern Massasauga Rattlesnake References

- Casper, G. S., Anton, T. G., Hay, R. W., Holycross, A. T., King, R. S., Kingsbury, B. A., . . . Wilson, T. P. (2001). *Recommended Standard Survey Protocol for the Eastern Massasauga, Sistrurus catenatus catenatus*. Milwaukee, WI: Report for the Milwaukee Public Museum.
- USFWS. (2016a, September 30). *Endangered and Threatened Wildlife and Plants; Threatened Species Status for the Eastern Massasauga Rattlesnake*. Retrieved from US Federal Register: <https://www.govinfo.gov/content/pkg/FR-2016-09-30/pdf/2016-23538.pdf#page=1>
- USFWS. (2016b, July 1). *Species Status Assessment for the Eastern Massasauga Rattlesnake (Sistrurus catenatus) SSA Report Version 2*. Retrieved from USFWS ECOS: <https://ecos.fws.gov/ServCat/DownloadFile/120127>
- USFWS. (2016c, September). *Eastern Massasauga Rattlesnake Sistrurus catenatus Factsheet*. Retrieved from Midwest Region Endangered Species: <https://www.fws.gov/midwest/endangered/reptiles/eama/pdf/EMRFactSheetSept2016.pdf>
- USFWS. (2021a, July 20). *Recovery Plan for the Eastern Massasauga Rattlesnake (Sistrurus catenatus)*. Retrieved from USFWS ECOS: https://ecos.fws.gov/docs/recovery_plan/Recovery%20Plan%20for%20Eastern%20Massasauga%20Rattlesnake_2021_508.pdf
- USFWS. (2021b, August 23). *5-Year Review Eastern Massasauga Rattlesnake (Sistrurus catenatus)*. Retrieved from USFWS ECOS: https://ecos.fws.gov/docs/tess/species_nonpublish/3422.pdf
- USFWS. (2021c). *MN WI DKey Standing Analysis Draft*.
- WDNR. (2020, October 8). Retrieved from Eastern Massasauga (Sistrurus catenatus): <https://dnr.wi.gov/topic/EndangeredResources/Animals.asp?mode=detail&SpecCode=ARADE03011>

¹Wildlife-safe materials are those that are 100% biodegradable and use a loose weave (often called leno weave) that allow animals to wiggle free. To minimize wildlife entanglement and plastic debris pollution, choose temporary erosion and sediment control products that either do not contain netting, or that contain netting manufactured from 100% biodegradable non-plastic materials such as jute, sisal, or coir fiber. Degradable, photodegradable, ultraviolet light-degradable, oxo-degradable, or oxo-biodegradable plastic netting (including polypropylene, nylon, polyethylene, and polyester) are not acceptable alternatives. All netting materials used should have a wildlife-safe, loose-weave design with movable, non-welded joints between the horizontal and vertical twines, allowing the twines to move independently and thus reducing the potential for wildlife entanglement. Avoid the use of silt fences reinforced with metal or plastic mesh. When no longer required, temporary erosion and sediment control products should be promptly removed.

²Appropriate plant species are native species or other suitable non-invasive species present on site prior to disturbance.

³Active season (April through November)

⁴Inactive season (December through March)

⁵May affect – Further consultation with the USFWS Minnesota Wisconsin Ecological Services Field Office is necessary in order to discern if the activity would result in a “no effect”, “not likely to adversely affect”, or “likely to adversely affect” determination.

⁶Suitable habitat includes a variety of wetland habitats and associated wetlands. Populations in Wisconsin are typically associated with floodplain habitats along rivers where they occupy open wetlands such as sedge meadows, wet meadows, shrub-carrs, and adjacent upland prairies, floodplain forests, and old fields. Eastern Massasauga Rattlesnakes also use open uplands and/or forest openings for foraging, basking, gestation and parturition (i.e., giving birth to young). Eastern Massasauga Rattlesnake habitats generally appear to be characterized by the following: (1) open, sunny areas intermixed with shaded areas, presumably for thermoregulation; (2) presence of the water table near the surface for hibernation; and (3) variable elevations between adjoining lowland and upland habitats. Suitable hibernation habitat are areas where Eastern Massasauga Rattlesnakes can use for shelter to survive the winter. Eastern Massasauga Rattlesnakes usually hibernate below the frost line in crayfish or small mammal burrows, tree root networks or rock cervices in or along the edge of wetlands or in adjacent upland areas with presumably high-water tables (areas where the soil is saturated but not inundated). Following egress from hibernacula in the spring, Eastern Massasauga Rattlesnakes typically remain above ground in the vicinity for a week or two and return to these areas in the fall for several weeks prior to entering hibernation. Surveys in the spring (shorting following egress) or fall (prior to ingress) when snakes are congregating in the vicinity may help identify these important areas. Maintaining stable hydrology of these areas is important during the inactive season.

⁷No effect – The proposed project would result in no effect to this species and/or its federally designated critical habitat (if applicable). Further consultation with the USFWS Minnesota Wisconsin Ecological Services Field Office is not necessary for the project as described.

⁸NLAA – For projects that reach a “not likely to adversely affect” determination, there is a 30-day “verification period” to allow the USFWS to review the project details and ensure the action meets the criteria for an NLAA determination. Output letters will indicate that if the project proponent does not hear otherwise within that timeframe, the NLAA determination is verified, and they can proceed with their action as described in the IPaC report and concurrence verification letter. This verification period allows the USFWS Minnesota Wisconsin Ecological Services Field Office to apply local knowledge to evaluation of the action and ensure actions do not have unanticipated impacts. Thus, there may be a small subset of actions for which the USFWS Minnesota Wisconsin Ecological Services Field Office may request additional information during this timeframe to verify the effects determination reached through the IPaC DKey.

⁹Follow posted speed limits and minimize speeds at facilities and access roads (e.g., <15 miles per hour on two-track roads).

¹⁰Cutting brush, mowing, applying herbicides.

¹¹In areas with turf grass or areas where you are trying to discourage Eastern Massasauga Rattlesnake (e.g., in areas around buildings), we recommend that you mow regularly and keep grass relatively short (less than 4–6 inches) to reduce its suitability for Eastern Massasauga Rattlesnake. If starting with longer grass (greater than 6 inches), mow during the inactive season initially, and then maintenance mowing can occur during the active season (if it is regularly maintained and kept shorter than 4–6 inches, so that Eastern Massasauga Rattlesnake is unlikely to use those areas). Unmaintained/longer grass may be used by snakes and make them vulnerable to mortality during the next mowing event. We consider turf grass to be manicured/regularly maintained lawn in areas adjacent to human structures.

¹²Refer to the *Recommended Standard Survey Protocol for the Eastern Massasauga* at:

https://www.fws.gov/sites/default/files/documents/508_easternmassasauga_surveyprotocol_1.pdf

¹³Refer to WI DNR Land Management in Eastern Massasauga Habitat at:

<https://dnr.wi.gov/topic/EndangeredResources/documents/LandManagementEasternMassasaugaHabitat.pdf>

Appendix 5 – Eastern Prairie Fringed Orchid (*Platanthera leucophaea*)

Eastern Prairie Fringed Orchid Species Summary

The Eastern Prairie Fringed Orchid is currently listed by the U.S. Fish and Wildlife Service (USFWS) under the Endangered Species Act (ESA) as ‘threatened’ across its range (USFWS, 1989). Threats to the Eastern Prairie Fringed Orchid are drainage and development of the species’ wetland habitat, spread of exotic species, and fire suppression (USFWS, 2020). Over collection is also an issue. The USFWS species profile for the Eastern Prairie Fringed Orchid can be found at <https://ecos.fws.gov/ecp/species/601>. Additional information can be found at <https://fws.gov/species/eastern-prairie-fringed-orchid-platanthera-leucophaea>. A summary of the ecology of this species can be found in the USFWS Eastern Prairie Fringed Orchid recovery plan (USFWS, 1999) and most recent 5-year review (USFWS, 2020). No critical habitat has been designated for this species.

Eastern Prairie Fringed Orchid Biological Information

The Eastern Prairie Fringed Orchid is a perennial herb that grows from an underground tuber. It is 8 to 40 inches (20 to 102 centimeters (cm)) tall and has an upright leafy stem with a flower cluster. The 3 to 8-inch (8 to 20 cm) lance-shaped leaves sheath the stem. Each plant has one single flower spike composed of 5 to 40 white flowers. Each flower has a 3-part fringed lip less than 1 inch (3 cm) long and a nectar spur (tube-like structure) which is 1 to 2 inches (3 to 5 cm) long (**Figure 1**).

Flowering begins from late June to early July and lasts for 7 to 10 days. Blossoms often rise just above the height of the surrounding grasses and sedges. The more exposed flower clusters are more likely to be visited by the Hawkmoth pollinators, though they are also at greater risk of being eaten by deer. Seed capsules mature over the growing season and are dispersed by the wind from late August through September. Night flying Hawkmoths pollinate the nocturnally fragrant flowers of this white orchid. Visiting Hawkmoths inadvertently collect pollen on their proboscises as they ingest nectar from the flower’s long nectar spurs.



Figure 1. *Eastern Prairie Fringed Orchid* (USFWS, 1999)

Eastern Prairie Fringed Orchid Suitable Habitat

The Eastern Prairie Fringed Orchid grows in a wide variety of habitats, from mesic prairie to wetlands such as sedge meadows, marsh edges, and bogs (USFWS, 2021; Bell, Bowles, Zettler, Pollack, & Ibberson, 2021) (**Figure 2**). The species may also occur along ditches or roadways where suitable habitat is present. The Eastern Prairie Fringed Orchid occurs on glacial soils, lake plain deposits, muck, or peat which ranges from neutral to mildly calcareous (Bowles, Zettler, & Kelsey, 2005). It requires full sun for optimum growth and flowering and a grassy habitat with little or no woody encroachment. A symbiotic relationship between the seed and soil fungi, called mycorrhizae, is necessary for seedlings to become established. These fungi help the seeds assimilate nutrients in the soil (USFWS, 2020).



Figure 2. *Eastern Prairie Fringed Orchid* suitable habitat (Bell, Bowles, Zettler, Pollack, & Ibberson, 2021)

In Wisconsin, Eastern Prairie Fringed Orchid is found in 40 counties. Suitable habitat in these counties differs considerably.

Eastern Prairie Fringed Orchid Critical Habitat

Critical habitat has not been designated for the Eastern Prairie Fringed Orchid.

Eastern Prairie Fringed Orchid Determination Key Guidance

The proposed action is the compilation of many different types of projects that, depending on their size and specific location often do not significantly affect any Federally listed threatened or endangered species or critical habitats in Minnesota and Wisconsin. Common project types include, but are not limited to, the following:

- Vegetation management, including mowing, forestry activities, prescribed burning, and harvest
- Construction, maintenance, operation, and/or removal of:
 - Roads/trails
 - Communication towers
 - Transmission/utility lines
 - Bridges/culverts
 - Oil/gas pipelines
 - Solar power facilities
 - Hydroelectric facilities/ dams
 - Mines/quarries
 - Canals/levees/dikes

- Commercial/residential/recreational developments
- Agricultural activities
- Site/habitat restoration/enhancement
- Shoreline protection/beach nourishment
- Dredging and filling of wetlands/waterbodies
- Military operations

No Effect

Projects that intersect the Eastern Prairie Fringed Orchid species list area may result in a No Effect (NE)¹ determination if both of the following apply:

- A survey was completed, and the Eastern Prairie Fringed Orchid was not detected.
 - Upload the survey results to IPaC. If unable to upload the survey to IPaC, email the survey results to the MNWI ES Field Office (TwinCities@fws.gov).
- The action area occurs in unsuitable habitat.

Not Likely to Adversely Affect

Projects that intersect the Eastern Prairie Fringed Orchid species list area may result in a Not Likely to Adversely Affect (NLAA)² determination if:

- There are restrictions on stream/hydrology-impacting or vegetation/ground-disturbing activities within the species list area/buffered habitat. Restrictions include actions that are likely to change the elevations of surface water upstream or downstream, or in the local groundwater (as estimated pre-action vs. post-action); as well as the potential to impact the riparian zone (up to 200 feet) or indirectly impact a stream or river (e.g., cut and fill, horizontal directional drilling, construction, vegetation removal, pesticide or fertilizer application, discharge, runoff of sediment or pollutants, increase in erosion).
- Restrictions on actions that may fragment habitat or create barriers to movement/dispersal within the species list area

May Affect

Projects that intersect the Eastern Prairie Fringed Orchid species list area and have either determined presence through a survey or have not conducted a survey will result in a May Affect (MA)³ determination if any of the following occurs:

- Suitable habitat is present
- Suitable habitat is present in the surrounding area
- There are known elemental occurrences⁴ in the action area/surrounding area
- There is evidence of habitat fragmentation in the action area/surrounding area
- The action occurs during flowering season
- Wetland delineation or habitat assessment/survey suggest presence of the species
- The species is observed during a site visit or there are reports of presence
- Disturbance of the ground or existing vegetation⁵
- Indirect alteration of the habitat or resources of the listed plant(s)⁶
- Direct harm to the listed plant(s)⁷

Eastern Prairie Fringed Orchid References

- Bell, T. J., Bowles, M. L., Zettler, L. W., Pollack, C. A., & Ibberson, J. E. (2021). Environmental and Management Effects on Demographic Processes in the U.S. Threatened *Platanthera leucophaea* (Nutt.) Lindl. (Orchidaceae). *Plants*, 10(7), 1308. doi:<https://doi.org/10.3390/plants10071308>
- Bowles, M. L., Zettler, T. B., & Kelsey, P. (2005). Relationships between Soil Characteristics, Distribution and Restoration Potential of the Federal Threatened Eastern Prairie Fringed Orchid, *Platanthera leucophaea* (Nutt.) Lindl. *The American Midland Naturalist*, 154: 273–285.
- USFWS. (1989, September 28). *Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for Eastern and Western Fringed Orchids*. Retrieved from US Federal Register: <https://www.govinfo.gov/content/pkg/FR-1989-09-28/pdf/FR-1989-09-28.pdf#page=145>
- USFWS. (1999, September 29). *Eastern Prairie Fringed Orchid *Platanthera leucophaea* (Nuttall) Lindley Recovery Plan*. Retrieved from USFWS ECOS: https://ecos.fws.gov/docs/recovery_plan/990929.pdf
- USFWS. (2020, December 15). *5-Year Review Eastern Prairie Fringed Orchid (*Platanthera leucophaea*)*. Retrieved from USFWS ECOS: https://ecos.fws.gov/docs/tess/species_nonpublish/3211.pdf
- USFWS. (2021, May 27). *Eastern Prairie Fringed Orchid*. Retrieved from Midwest Region Endangered Species: <https://www.fws.gov/midwest/endangered/plants/epfo/index.html>
- WDNR. (2021, May 5). *Species Guidance*. Retrieved from Eastern Prairie White Fringed Orchid (*Platanthera leucophaea*): <https://dnr.wi.gov/topic/EndangeredResources/Plants.asp?mode=detail&SpecCode=PMORC1Y0F0>

¹No effect – The proposed project would result in no effect to this species and/or its federally designated critical habitat (if applicable). Further consultation with the USFWS Minnesota Wisconsin Ecological Services Field Office is not necessary for the project as described.

²NLAA – For projects that reach a “not likely to adversely affect” determination, there is a 30 day “verification period” to allow the USFWS to review the project details and ensure the action meets the criteria for a NLAA determination. Output letters will indicate that if the project proponent does not hear otherwise within that timeframe, the NLAA determination is verified, and they can proceed with their action as described in the IPaC report and concurrence verification letter. This verification period allows the USFWS Minnesota Wisconsin Ecological Services Field Office to apply local knowledge to evaluation of the action and ensure actions do not have unanticipated impacts. Thus, there may be a small subset of actions for which the USFWS Minnesota Wisconsin Ecological Services Field Office may request additional information during this timeframe to verify the effects determination reached through the IPaC DKey.

³May affect – Further consultation with the USFWS Minnesota Wisconsin Ecological Services Field Office is necessary in order to discern if the activity would result in a “no effect”, “not likely to adversely affect”, or “likely to adversely affect” determination.

⁴Elemental occurrence data can be accessed from the Wisconsin Natural Heritage Inventory: <https://dnr.wisconsin.gov/topic/NHI> and the Minnesota Department of Natural Resources Natural Heritage Information System: <https://www.dnr.state.mn.us/nhnrp/nhis.html>

⁵This includes any off-road vehicle access, soil compaction, digging, seismic survey, directional drilling, heavy equipment, grading, trenching, placement of fill, pesticide application (herbicide, fungicide), vegetation management (including removal or maintenance using equipment or chemicals), cultivation, development, etc.

⁶For example, actions that cause a change in canopy cover, microclimate, humidity, increase in invasive species, hydrologic alterations, etc.

⁷For example, through prescribed fire, herbicide application, trampling, increased herbivory, cutting/clearing, cultivation, crushing by vehicle, reduction to possession, etc.

Appendix 6 – Fassett’s Locoweed (*Oxytropis campestris* var. *chartacea*)

Fassett’s Locoweed Species Summary

Fassett’s Locoweed is currently listed by the U.S. Fish and Wildlife Service (USFWS) under the Endangered Species Act (ESA) as ‘threatened’ across its range (USFWS, 1988). Threats to the species include development, recreational use, cattle grazing, diminished water levels because of agricultural land use, and pesticide runoff (USFWS, 2003). The USFWS species profile for Fassett’s Locoweed can be found at <https://ecos.fws.gov/ecp/species/209>. Additional information is available at <https://www.fws.gov/species/field-locoweed-oxytropis-campestris-var-chartacea>. A summary of the ecology of this species can be found in the USFWS Fassett’s Locoweed recovery plan (USFWS, 1991) and most recent 5-year review (USFWS, 2013). No critical habitat has been designated for this species.

Fassett’s Locoweed Biological Information

Fassett’s Locoweed is a 4 to 12-inch (10 to 30 centimeters (cm)) tall perennial herb of the pea family. These plants live for several years, reappearing each spring from underground perennial tap roots. Fassett’s Locoweed is covered in white, silky hairs that makes it appear silvery gray. The leaves of mature plants are 3 to 8 inches (8 to 20 cm) long and each leaf is made up of 18 to 30 leaflets, lance-linear to lance-ovate, 0.5 to 2.5 cm. Leaves are densely hairy at first with long, lax but not strongly spreading hairs. As they mature, they become more thinly hairy or partly smooth. An individual plant produces 1 to 20 stems, and each stem can have 10 to 20 flowers (**Figure 1**).

Fassett’s Locoweed blooms from mid-May through mid-June, with 0.5 to 0.75-inch long (1 to 2 cm), rose-pink to violet inflorescence (**Figure 2**). Both small and large bees have been observed visiting flowers, but the pollinator is not definitively known (USFWS, 2003).

Fassett’s Locoweed produces small black seeds from pale-yellow pods. The species reproduces entirely by seed. Fruit is lance-ovoid, with a papery texture, not rigid, sparsely hairy with loose hairs, 0.5 to 1.0 inches (1.5 to 2.5 cm) including the beak (WDNR, 2021). Fruiting occurs late June through late July, and optimal identification for the species is late May through July (WDNR, 2021).



Figure 1. *Fassett's Locoweed* (USFWS, 2013)



Figure 2. *Fassett's Locoweed flower* (Derek Anderson, Flora of Wisconsin Consortium of Wisconsin Herbaria)

Fassett's Locoweed Suitable Habitat

Fassett's Locoweed grows on gentle, sand-gravel shoreline slopes around shallow lakes fed by groundwater seepage (**Figure 3**). These lakes are subject to frequent, large fluctuations in water levels, which affects the suitable habitat available for Fassett's Locoweed. Fassett's Locoweed may depend on the open habitat provided during times of low lake levels and a large seed bank of dormant seeds in the soil for long-term population maintenance (USFWS, 2003).



Figure 3. *Fassett's Locoweed suitable habitat, Pigeon Lake, Bayfield County* (Emmet Judziewicz, University of Wisconsin Stevens Point, 2009) (USFWS, 2013)

Fassett's Locoweed is found exclusively in Bayfield, Portage, Douglas, and Waushara counties in Wisconsin. Of the 10 lakes that support Fassett's Locoweed, the plant currently occurs in highest numbers

(thousands) at 4 lakes; Pigeon, Mountain, Plainfield, and Pickerel lakes, but it is unclear if these populations are self-sustaining.

Fassett's Locoweed Critical Habitat

Critical habitat has not been designated for Fassett's Locoweed.

Fassett's Locoweed Determination Key Guidance

The proposed action is the compilation of many different types of projects that depending on their size and specific location, often do not significantly affect any Federally listed threatened or endangered species or critical habitats in Minnesota and Wisconsin. Common project types include, but are not limited to, the following:

- Vegetation management, including mowing, forestry activities, prescribed burning, and harvest
- Construction, maintenance, operation, and/or removal of:
 - Roads/trails
 - Communication towers
 - Transmission/utility lines
 - Bridges/culverts
 - Oil/gas pipelines
 - Solar power facilities
 - Hydroelectric facilities/ dams
 - Mines/quarries
 - Canals/levees/dikes
- Commercial/residential/recreational developments
- Agricultural activities
- Site/habitat restoration/enhancement
- Shoreline protection/beach nourishment
- Dredging and filling of wetlands/waterbodies
- Military operations

No Effect

Projects that intersect the Fassett's Locoweed species list area may result in a No Effect (NE)¹ determination if both of the following apply:

- A survey was completed and the Fassett's Locoweed was not detected.
 - Upload the survey results to IPaC. If unable to upload the survey to IPaC, email the survey results to the MNWI ES Field Office (TwinCities@fws.gov).
- The action area occurs in unsuitable habitat.

Not Likely to Adversely Affect

Projects that intersect Fassett's Locoweed species list area may result in a Not Likely to Adversely Affect (NLAA)² determination if:

- There are restrictions on stream/hydrology-impacting or vegetation/ground-disturbing activities within the species list area/buffered habitat. Restrictions include actions that are likely to change

the elevations of surface water upstream or downstream, or in the local groundwater (as estimated pre-action vs. post-action); as well as the potential to impact the riparian zone (up to 200 feet) or indirectly impact a stream or river (e.g., cut and fill, horizontal directional drilling, construction, vegetation removal, pesticide or fertilizer application, discharge, runoff of sediment or pollutants, increase in erosion).

- Restrictions on actions that may fragment habitat or create barriers to movement/dispersal within the species list area.

May Affect

Projects that intersect Fassett's Locoweed species list area and have either determined presence through a survey or have not conducted a survey will result in a May Affect (MA)³ determination if any of the following occurs:

- Suitable habitat is present
- Suitable habitat is present in the surrounding area
- There are known elemental occurrences⁴ in the action area/surrounding area
- There is evidence of habitat fragmentation in the action area/surrounding area
- The action occurs during flowering season
- Wetland delineation or habitat assessment/survey suggest presence of the species
- The species is observed during a site visit or there are reports of presence
- Disturbance of the ground or existing vegetation⁵
- Indirect alteration of the habitat or resources of the listed plant(s)⁶
- Direct harm to the listed plant(s)⁷

Fassett's Locoweed References

USFWS. (1988, September 28). *Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for *Oxytropis campestris* var. *chartacea**. Retrieved from US Federal Register: <https://www.govinfo.gov/content/pkg/FR-1988-09-28/pdf/FR-1988-09-28.pdf#page=252>

USFWS. (1991, March 29). *Fassett's Locoweed (*Oxytropis campestris* var. *chartacea*) Recovery Plan*. Retrieved from USFWS ECOS: https://ecos.fws.gov/docs/recovery_plan/910329.pdf

USFWS. (2003, January). *Fassett's Locoweed (*Oxytropis campestris* var. *chartacea*) Fact Sheet*. Retrieved from USFWS Midwest Region Endangered Species: <https://www.fws.gov/midwest/endangered/plants/pdf/fassetts.pdf>

USFWS. (2013, June 19). *Fassett's Locoweed (*Oxytropis campestris* var. *chartacea*) 5-Year Review: Summary and Evaluation*. Retrieved from USFWS ECOS: https://ecos.fws.gov/docs/tess/species_nonpublish/2153.pdf

WDNR. (2021, May 5). *Species Guidance*. Retrieved from Fassett's Locoweed (*Oxytropis campestris* var. *chartacea*): <https://dnr.wi.gov/topic/EndangeredResources/Plants.asp?mode=detail&SpecCode=PDFAB2X041>

¹No effect – The proposed project would result in no effect to this species and/or its federally designated critical habitat (if applicable). Further consultation with the USFWS Minnesota Wisconsin Ecological Services Field Office is not necessary for the project as described.

²NLAA – For projects that reach a “not likely to adversely affect” determination, there is a 30 day “verification period” to allow the USFWS to review the project details and ensure the action meets the criteria for a NLAA determination. Output letters will indicate that if the project proponent does not hear otherwise within that timeframe, the NLAA determination is verified and they can proceed with their action as described in the IPaC report and concurrence verification letter. This verification period allows the USFWS Minnesota Wisconsin Ecological Services Field Office to apply local knowledge to evaluation of the action and ensure actions do not have unanticipated impacts. Thus, there may be a small subset of actions for which the USFWS Minnesota Wisconsin Ecological Services Field Office may request additional information during this timeframe to verify the effects determination reached through the IPaC Dkey.

³May affect – Further consultation with the USFWS Minnesota Wisconsin Ecological Services Field Office is necessary in order to discern if the activity would result in a “no effect”, “not likely to adversely affect”, or “likely to adversely affect” determination.

⁴Elemental occurrence data can be accessed from the Wisconsin Natural Heritage Inventory: <https://dnr.wisconsin.gov/topic/NHI> and the Minnesota Department of Natural Resources Natural Heritage Information System: <https://www.dnr.state.mn.us/nhnrp/nhis.html>

⁵This includes any off-road vehicle access, soil compaction, digging, seismic survey, directional drilling, heavy equipment, grading, trenching, placement of fill, pesticide application (herbicide, fungicide), vegetation management (including removal or maintenance using equipment or chemicals), cultivation, development, etc.

⁶For example, actions that cause a change in canopy cover, microclimate, humidity, increase in invasive species, hydrologic alterations, etc.

⁷For example, through mowing/haying, prescribed fire, herbicide application, trampling, increased herbivory, cutting/clearing, cultivation, crushing by vehicle, reduction to possession, etc.

Appendix 7 – Gray Wolf (*Canis Lupus*)

Gray Wolf Species Summary

The Gray Wolf is currently listed by the U.S. Fish and Wildlife Service (USFWS) under the Endangered Species Act (ESA) as ‘threatened’ in Minnesota and ‘endangered’ across the rest of its range (USFWS, 2020a) except for the Northern Rocky Mountain population. Threats to Gray Wolf in the Great Lakes region include disease and human-caused mortality from mammal trapping, poison bait, vehicle collisions, and habitat loss (e.g., permanent conversion of forested habitat). The USFWS species profile for the Gray Wolf can be found at <https://ecos.fws.gov/ecp/species/4488>. Additional information can be found at <https://www.fws.gov/species/gray-wolf-canis-lupus>.

A summary of the ecology of this species can be found in the USFWS Recovery Plan for the Eastern Timber Wolf-Revised (USFWS, 1992), Gray Wolf Final Post Delisting Monitoring Plan (USFWS, 2008), and the most recent 5-year review (USFWS, 2012). Critical habitat was designated for the Gray Wolf in 1978 (USFWS, 1978). There are special regulations under section 4(d) of the Act for operating a wolf management program in Minnesota.

Gray Wolf Biological Information

Gray wolves (*Canis lupus*) are the largest wild members of Canidae, or dog family, with adults ranging in weight from 40 to 145 pounds (18 to 66 kilograms), depending on sex and geographic locale. Male wolves range from 70 to 115 pounds (32 to 52 kilograms) in weight and female wolves range from 60 to 100 pounds (27 to 45 kilograms) in weight. Pelt color varies in wolves more than in almost any other species, from white to grizzled gray to brown to coal black. The average size of males is 5 to 6.5 feet long (1.5 to 2 meters) (tip of nose to tip of tail), and 26 to 32 inches (66 to 81 centimeters) high at the shoulder. The average size of females is 4.5 to 6 feet (1.4 to 1.9 meters) long, and 26 to 32 inches (66 to 81 centimeters) high at the shoulder (**Figure 1**). Wolves reach adult size by 1 year of age.

Wolves are well adapted to traveling fast and far in search of food, and to catching and eating large mammals. In North America, they are primarily predators of medium to large mammals, including deer, elk, and other species, and are efficient at shifting their diet to take advantage of other available food resources.

Gray wolves are highly social animals that live in groups, called packs, which typically include a breeding pair, their offspring, and other non-breeding adults. Wolves are capable of mating by age one or two and sometimes form a lifelong bond. On average, four to five pups are born in early spring and are cared for by the entire pack. For the first six weeks, pups are reared in dens. Dens are often used year after year, but wolves may also dig new ones or use some other type of shelter, such as a cave. After a year or two, young wolves often leave their packs to try to find a mate and form a pack or join other existing packs. Wolf packs occupy and defend territories, which range in size from less than 50 square miles to more than 1,000 square miles, depending on habitat and seasonal movements of available prey. Wolves travel over large areas to hunt, as far as 30 miles in a day. Although they usually trot along at five miles per hour, wolves can run as fast as 40 miles per hour for short distances.



Figure 1. Gray Wolf (*Canis lupus*), photo courtesy of Gary Kramer, USFWS

Gray Wolf Suitable Habitat

Gray wolves are a highly adaptable species that once ranged from coast to coast. They can successfully occupy a wide range of habitats provided adequate prey exists and human-caused mortality is sufficiently regulated. Scientific models generally depict high-quality suitable habitat as areas with sufficient prey where human influences on the dynamics of the wolf population is relatively low (USFWS 2020b).

Gray Wolf Critical Habitat

Critical habitat was designated for the Gray Wolf in 1978 (USFWS, 1978). Critical habitat was identified in portions of northern Minnesota and on Isle Royale in Michigan. There are no biological and physical features (e.g. Primary Constituent Elements) identified for Gray Wolf critical habitat.

Gray Wolf Determination Key Guidance

The proposed action is the compilation of many different types of projects that, depending on their size and specific location, often do not significantly affect any Federally listed threatened or endangered

species or critical habitats in Minnesota and Wisconsin. Common project types include, but are not limited to, the following:

- Vegetation management, including mowing, forestry activities, prescribed burning, and harvest
- Construction, maintenance, operation, and/or removal of:
 - Roads/trails
 - Communication towers
 - Transmission/utility lines
 - Bridges/culverts
 - Oil/gas pipelines
 - Solar power facilities
 - Hydroelectric facilities/ dams
 - Mines/quarries
 - Canals/levees/dikes
- Commercial/residential/recreational developments
- Agricultural activities
- Site/habitat restoration/enhancement
- Shoreline protection/beach nourishment
- Dredging and filling of wetlands/waterbodies
- Military operations

Projects that intersect the gray wolf AOI must not:

- Overlap with a known gray wolf denning or rendezvous area (users are directed to contact the lead gray wolf biologist with the Minnesota or Wisconsin Department of Natural Resources for assistance in determining whether their project area may overlap known denning or rendezvous areas)
- Have any potential for the action to harm wolves directly (e.g., mammal trapping, poison bait), or indirectly (e.g., increasing vehicle use that may result in vehicle strikes, exposure to potential human persecution)

Not Likely to Adversely Affect¹

- There is NO potential for the action to harm wolves directly (e.g., mammal trapping, poison bait), or indirectly (e.g., increasing vehicle use that may result in vehicle strikes, exposure to potential human persecution)

May Affect²

Projects that intersect the Gray Wolf species list area may result in a May Affect (MA) determination if:

- The action area intersects with a known gray wolf denning or rendezvous area
 - OR
- There is potential for the action to harm wolves directly (e.g., mammal trapping, poison bait), or indirectly (e.g., increasing vehicle use that may result in vehicle strikes, exposure to potential human persecution)

Critical Habitat

Consultation³ is required for projects that intersect Gray Wolf CH and:

- Result in permanent changes to habitat quality, quantity, or availability (e.g., permanent conversion of forested habitat, new highways, etc.)

Gray Wolf References

USFWS. (1978, March 9). Recovery plan for the eastern timber wolf. Washington, D.C. 79 pp. Retrieved from US Federal Register:

https://www.fws.gov/sites/default/files/federal_register_document/FR-1978-03-09.pdf

USFWS. (1992). Recovery plan for the eastern timber wolf. Twin Cities, MN 73 pp. Retrieved on 1-13-2023 at: https://ecos.fws.gov/docs/recovery_plan/920131.pdf

USFWS. (2008). Post-Delisting Monitoring Plan for the Western Great Lakes Distinct Population Segment of the Gray Wolf (*Canis lupus*) 2 pp. <https://www.fws.gov/node/66105>

USFWS. (2012). *Lower 48-State and Mexico Gray Wolf (Canis lupus) listing, as revised. 5-year Review: Summary and Evaluation*. Retrieved on 1-13-2023 at:

https://ecos.fws.gov/docs/tess/species_nonpublish/1903.pdf

USFWS. (2020a). Removing the Gray Wolf (*Canis lupus*) From the List of Endangered and Threatened Wildlife 117 pp. Retrieved on 1-13-2023 at:

<https://www.federalregister.gov/documents/2020/11/03/2020-24171/endangered-and-threatened-wildlife-and-plants-removing-the-gray-wolf-canis-lupus-from-the-list-of>

USFWS. (2020b). Gray Wolf Biological Report: Information on the Species in the Lower 48 United States 52 pp.

¹NLAA – For projects that reach a “not likely to adversely affect” determination, there is a 30 day “verification period” to allow the USFWS to review the project details and ensure the action meets the criteria for a NLAA determination. Output letters will indicate that if the project proponent does not hear otherwise within that timeframe, the NLAA determination is verified and they can proceed with their action as described in the IPaC report and concurrence verification letter. This verification period allows the USFWS Minnesota Wisconsin Ecological Services Field Office to apply local knowledge to evaluation of the action and ensure actions do not have unanticipated impacts. Thus, there may be a small subset of actions for which the USFWS Minnesota Wisconsin Ecological Services Field Office may request additional information during this timeframe to verify the effects determination reached through the IPaC Dkey.

²May affect – Further consultation with the USFWS Minnesota Wisconsin Ecological Services Field Office is necessary in order to discern if the activity would result in a “no effect”, “not likely to adversely affect”, or “likely to adversely affect” determination.

³Consultation required - Further consultation with the USFWS Minnesota Wisconsin Ecological Services Field Office is necessary in order to discern if the activity would result in a “no effect”, “not likely to adversely affect”, or “likely to adversely affect” determination.

Appendix 8 – Higgins Eye Pearlymussel (*Lampsilis higginsii*)

Higgins Eye Pearlymussel Species Summary

Higgins Eye Pearlymussel is currently listed by the U.S. Fish and Wildlife Service (USFWS) under the Endangered Species Act (ESA) as ‘endangered’ across its range (USFWS, 1976). Major threats include toxic chemical spills and invasive species, such as the Zebra Mussel (USFWS, 2020). Construction activities and poor water quality also threaten the species (USFWS, 2004). The USFWS species profile for Higgins Eye Pearlymussel can be found at <https://ecos.fws.gov/ecp/species/5428>. Additional information can be found at <https://fws.gov/species/higgins-eye-lampsilis-higginsii>. A summary of the ecology of this species can be found in the USFWS Higgins Eye Pearlymussel recovery plan (USFWS, 2004) and the most recent 5-year review (USFWS, 2020). No critical habitat has been designated for this species.

Higgins Eye Pearlymussel Biological Information

The shell of the Higgins Eye Pearlymussel is up to 4 inches (in) (10.2 centimeters [cm]) long and is inflated with thick valves and a beak that is pointed forward (**Figure 1**). The shell is oval, elliptical, or rhomboid (WDNR, 2020). This species is sexually dimorphic, with the females having a shell that is rounded and truncate posteriorly, while the males have a shell that is oval. The beak sculpture in both sexes is obscure, and the pseudocardinal and lateral teeth are well developed. The outside of the shell is yellow, greenish, reddish, or brown, often with green rays. The nacre of the shell is white, and sometimes pink or salmon in the beak cavity (MNDNR, 2022).

Higgins Eye Pearlymussel bury themselves in the sand and gravel river bottoms with just the edge of their partially opened shells exposed. The river's currents flow over the mussels as they siphon water for microorganisms such as algae and bacteria.

Male Higgins Eye Pearlymussels release sperm into the river current and downstream females siphon in the sperm to fertilize their eggs. After fertilization, females store the developing larvae (glochidia) in their gills until they are expelled into the river current. Some of the glochidia attach themselves to the gills of host fish, where they develop further. After a few weeks, the juvenile Higgins Eye Pearlymussels detach from the gills of the fish and settle on the river bottom, where they can mature into adult mussels and possibly live up to 50 years. The Sauger, Walleye, Yellow Perch, Largemouth and Smallmouth Bass, Freshwater Drum, Bluegill, Green Sunfish, Yellow Perch, and Northern Pike are considered suitable hosts for Higgins Eye Pearlymussel glochidia. Breeding season occurs from July through October (WDNR, 2020).



Figure 1. Higgins Eye Pearlymussel (Illinois Natural History Survey)

Higgins Eye Pearlymussel Suitable Habitat

Higgins Eye Pearlymussel is characterized as a large river species occupying stable substrates that vary from sand to boulders, but not firmly packed clay, flocculent silt, organic material, bedrock, concrete or unstable sand (USFWS, 2004; WDNR, Higgins Eye (*Lampsilis higginsii*), 2020). They are usually found in areas of deep water and moderate currents (**Figure 2**). Suitable water velocities are less than 1 meter (m)/second during periods of low discharge. They are usually found in mussel beds that contain at least 15 other species at densities greater than 0.01 individual/m². In the Mississippi River, the density of all mussels in the bed typically exceeds 10/m² (USFWS, 2004).

Higgins Eye Pearlymussel can be found in Illinois, Iowa, Minnesota, Missouri, Nebraska, South Dakota, and Wisconsin. Essential Habitat Areas (EHAs) were identified by the USFWS in the 1983 Higgins Eye Recovery Plan. ESAs are areas capable of supporting reproducing populations of Higgins Eye Pearlymussel and are important to the conservation of the species (USFWS, 2004).



Figure 2. Wisconsin River (University of Wisconsin – Wisconsin Geological and Natural History Survey)

In Minnesota and Wisconsin, the species occurs in the upper Mississippi, lower Wisconsin, and St. Croix rivers (WDNR, 2020).

Higgins Eye Pearlymussel Critical Habitat

Critical habitat has not been designated for Higgins Eye Pearlymussel.

Higgins Eye Pearlymussel Determination Key Guidance

The proposed action is the compilation of many different types of projects that, depending on their size and specific location, often do not significantly affect any Federally listed threatened or endangered species or critical habitats in Minnesota and Wisconsin. Common project types include, but are not limited to, the following:

- Vegetation management, including mowing, forestry activities, prescribed burning, and harvest
- Construction, maintenance, operation, and/or removal of:
 - Roads/trails
 - Communication towers
 - Transmission/utility lines
 - Bridges/culverts
 - Oil/gas pipelines
 - Solar power facilities
 - Hydroelectric facilities/ dams
 - Mines/quarries
 - Canals/levees/dikes
- Commercial/residential/recreational developments
- Agricultural activities
- Site/habitat restoration/enhancement
- Shoreline protection/beach nourishment
- Dredging and filling of wetlands/waterbodies
- Military operations

No Effect

Projects that intersect the Higgins Eye Pearlymussel species list area may result in a No Effect (NE)¹ determination if:

- The action will NOT permanently affect local hydrology
AND
- will NOT have any direct² impacts to a stream or river
AND
- does NOT have the potential to impact the riparian zone
OR
- will NOT have indirect³ impacts to a stream or river

Not Likely to Adversely Affect

Projects that intersect the species list area may result in a Not Likely to Adversely Affect (NLAA)⁵ determination if:

- An approved survey⁶ was conducted and Higgins Eye were not observed⁷ in the project area.

May Affect

Projects that intersect the Higgins Eye Pearlymussel species list area may result in a May Affect (MA)⁴ determination if:

- The action will temporarily or permanently affect local hydrology
OR
- will have any direct² or indirect³ impacts to a stream or river
OR
has the potential to impact the riparian zone

Higgins Eye Pearlymussel References

- MNDNR. (2022). *Lampsilis higginsii* (I. Lea, 1857) Higgins Eye. Retrieved from MNDNR:
<https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=IMBIV21100>
- USFWS. (1976, June 14). *Endangered Status for 159 Taxa of Animals*. Retrieved from US Federal Register: <https://www.govinfo.gov/content/pkg/FR-1976-06-14/pdf/FR-1976-06-14.pdf#page=1>
- USFWS. (2004, May 12). *Higgins Eye Pearlymussel (Lampsilis higginsii) Recovery Plan: First Revision*. Retrieved from USFWS ECOS: https://ecos.fws.gov/docs/recovery_plan/040714.pdf
- USFWS. (2020, August 27). *Higgins Eye (Pearlymussel) (Lampsilis higginsii) 5-Year Review: Summary and Evaluation*. Retrieved from USFWS ECOS:
https://ecos.fws.gov/docs/tess/species_nonpublish/3069.pdf
- WDNR. (2020, October 8). *Higgins Eye (Lampsilis higginsii)*. Retrieved from WDNR:
<https://dnr.wi.gov/topic/EndangeredResources/Animals.asp?mode=detail&SpecCode=IMBIV21100>

¹No effect – The proposed project would result in no effect to this species and/or its federally designated critical habitat (if applicable). Further consultation with the USFWS Minnesota Wisconsin Ecological Services Field Office is not necessary for the project as described.

²Horizontal Directional Drilling, hydrostatic testing, stream/road crossings, new stormwater outfall discharge, dams, other in-stream work, etc.

³Cut and fill, horizontal directional drilling, construction, vegetation removal, pesticide or fertilizer application, discharge, runoff of sediment or pollutants, increase in erosion, etc.

⁴May affect – Further consultation with the USFWS Minnesota Wisconsin Ecological Services Field Office is necessary in order to discern if the activity would result in a “no effect”, “not likely to adversely affect”, or “likely to adversely affect” determination.

⁵NLAA – For projects that reach a “not likely to adversely affect” determination, there is a 30 day “verification period” to allow the USFWS to review the project details and ensure the action meets the criteria for a NLAA determination. Output letters will indicate that if the project proponent does not hear otherwise within that timeframe, the NLAA determination is verified and they can proceed with their action as described in the IPaC report and concurrence verification letter. This verification period allows the USFWS Minnesota Wisconsin Ecological Services Field Office to apply local knowledge to evaluation of the action and ensure actions do not have unanticipated impacts. Thus, there may be a small subset of actions for which the USFWS Minnesota Wisconsin Ecological Services Field Office may request additional information during this timeframe to verify the effects determination reached through the IPaC Dkey.

⁶You must receive prior approval for any proposed mussel survey by contacting the Minnesota-Wisconsin Ecological Services Field Office. All mussel surveys in Minnesota and Wisconsin must comply with State approved protocols.

Minnesota Mussel Protocol: <https://files.dnr.state.mn.us/eco/nhnrp/mn-mussel-survey-and-relocation-protocol.pdf>.

Wisconsin Mussel Protocol:

https://molluskconservation.org/Library/Protocol%20PDFs/WI%20Wadable%20Mussel%20Protocol_8-18-15.pdf

⁷A positive observation includes collection of any shells (live or dead and in any condition)

Appendix 9 – Hine’s Emerald Dragonfly (*Somatochlora hineana*)

Hine’s Emerald Dragonfly Species Summary

The Hine’s Emerald Dragonfly is currently listed by the U.S. Fish and Wildlife Service (USFWS) under the Endangered Species Act (ESA) as ‘endangered’ across its range (USFWS, 1995). Major threats to the species are habitat destruction and alteration from actions such as commercial and residential development, quarrying, landfills, roadways, construction of pipelines, filling of wetlands and non-point pollution from golf courses and roadways. Changes in surface and sub-surface hydrology may also be detrimental because alteration of hydrologic regimes can adversely affect the larval and breeding habitat of the species by changing water temperature, flow, chemistry, and volume. The USFWS species profile for Hine’s Emerald Dragonfly can be found at <https://ecos.fws.gov/ecp/species/7877>. Additional information can be found at <https://fws.gov/species/hines-emerald-somatochlora-hineana>. A summary of the ecology of this species can be found in the USFWS Hine’s Emerald Dragonfly recovery plan (USFWS, 2001) and most recent 5-year review (USFWS, 2019).

Hine’s Emerald Dragonfly Biological Information

The Hine’s Emerald Dragonfly has brilliant green eyes and a dark metallic green thorax with 2 distinct creamy-yellow lateral lines (**Figure 1**). The larva (nymph, naiad) is approximately 1 inch (2.5 centimeters (cm)) in length and is light to dark brown when mature. The body is densely clothed with coarse setae (hair) (WDNR, 2020). After emerging as an adult the eyes are brown, but they turn green within 1 to 3 days. Adult body length is 2.3 to 2.5 inches (6 to 6.5 cm). Wingspan is 3.5 to 3.7 inches (9 to 9.5 cm). The wings are clear and may have an amber hue towards the base of the hind wings. Near the end of the lifespan, the wings may turn from clear to a slightly opaque, smokey color (USFWS, 2001). Distinctive shaped terminal appendages and ovipositors separate adult Hine’s Emerald Dragonfly from other dragonfly species.

Adult female dragonflies lay eggs in water or mud after reaching the adult period sometime between June and August. Adult males defend small breeding territories, pursuing and mating with females who enter. The female lays eggs by repeatedly plunging the tip of her body into shallow water. Later in the season or the following spring, immature dragonflies, called nymphs, hatch from the eggs. When the eggs hatch the larvae spend up to 5 years in small streams and wetlands. The nymph lives in shallow water for approximately 2 to 4 years, eating smaller aquatic insects and shedding its skin many times. The nymph then crawls out of the water and sheds its skin a final time, emerging as a flying adult and recognizable as a dragonfly. Adult Hine’s Emerald Dragonflies emerge as early as late July and continue to emerge throughout the summer.

The adult stage is comparatively brief, lasting no more than a 6-week period from June through August. They capture prey in flight, feeding actively during daylight hours. The Hine’s Emerald Dragonfly flight period extends from early to late July (WDNR, 2020).



Figure 1. *Hine's Emerald Dragonfly* (Kathryn Kirk, WDNR)

Hine's Emerald Dragonfly Suitable Habitat

The Hine's Emerald Dragonfly lives in calcareous, spring-fed marshes and sedge meadows overlaying dolomite bedrock. The Hine's Emerald Dragonfly larvae live in wetlands dominated by graminoid (grass-like) plants and fed in part by groundwater. Two characteristics that are common to wetlands inhabited by the Hine's Emerald Dragonfly, appear to be shallow groundwater flowing slowly through vegetation, and underlying dolomitic limestone bedrock or cobble and weathered bedrock. The flowing water can range from barely detectable sheet flow through vegetation or a small well-defined streamlet or rivulet channel (USFWS, 2001). These areas are typically characterized by the presence of slowly flowing water and nearby or adjacent forest edges (USFWS, 2001). Complex wetlands with a forest edge and cool shallow water are important for perching, resting, foraging and mating sites (USFWS, 2001; Cobb & Bradbury, 2008).

Small, calcareous, marshy streams appear to be common at all Wisconsin sites. Marshes are dominated by cattails (*Typha* species), and sedge meadows are dominated by sedges (*Carex* species). Ridge-swale, river estuary, cedar swamps, low-gradient first and second order streams are habitat types that Hine's Emerald Dragonfly inhabits in Wisconsin. Bedrock is exposed at the surface of some of the sites. Stream substrates are primarily muck and peat with some sand. Surrounding habitats include cedar swamps dominated by White Cedar, wet mesic upland forests, and old field communities (**Figure 2**). Tamarack, Black Ash, and Eastern White Pine are tree species that are present in this area. Beaver impoundments are known to occur at some locations.



Figure 2. The Hine's Emerald Dragonfly ovipositing habitat at Cedarburg Bog (Kathryn Kirk, WDNR)

Hine's Emerald Dragonfly Critical Habitat

Critical habitat was designated for the Hine's Emerald Dragonfly in 2010 (USFWS, 2010). Critical habitat for the Hine's Emerald Dragonfly consists of the following 2 biological and physical features (e.g. Primary Constituent Elements).

(1) For egg deposition and larval growth and development:

- (a) Organic soils (histosols, or with organic surface horizon) overlying calcareous substrate predominantly dolomite and limestone bedrock);
- (b) Calcareous water from intermittent seeps and springs and associated shallow, small, slow flowing streamlet channels, rivulets, and/or sheet flow within fens;
- (c) Emergent herbaceous and woody vegetation for emergence facilitation and refugia;
- (d) Occupied burrows maintained by crayfish for refugia; and
- (e) Prey base of aquatic macroinvertebrates, including mayflies, aquatic isopods, caddisflies, midge larvae, and aquatic worms.

(2) For adult foraging; reproduction; dispersal; and refugia necessary for roosting, resting, refuge for adult females to escape from male harassment, and predator avoidance (especially during the vulnerable teneral stage):

- (a) Natural plant communities near the breeding/larval habitat which may include fen, marsh, sedge meadow, dolomite prairie, and the fringe (up to 328 ft (100m)) of bordering shrubby and forested areas with open corridors for movement and dispersal; and
- (b) Prey base of small flying insect species (e.g., dipterans).

Hine's Emerald Dragonfly Determination Key Guidance

The proposed action is the compilation of many different types of projects that, depending on their size and specific location, often do not significantly affect any federally listed threatened or endangered species or critical habitats in Minnesota and Wisconsin. Common project types include, but are not limited to, the following:

- Vegetation management, including mowing, forestry activities, prescribed burning, and harvest
- Construction, maintenance, operation, and/or removal of:
 - Roads/trails
 - Communication towers
 - Transmission/utility lines
 - Bridges/culverts
 - Oil/gas pipelines
 - Solar power facilities
 - Hydroelectric facilities/ dams
 - Mines/quarries
 - Canals/levees/dikes
- Commercial/residential/recreational developments
- Agricultural activities
- Site/habitat restoration/enhancement
- Shoreline protection/beach nourishment
- Dredging and filling of wetlands/waterbodies
- Military operations

Not Likely to Adversely Affect

Projects that intersect Hine's Emerald Dragonfly species list area may result in a Not Likely to Adversely Affect (NLAA)¹ determination if the following occurs:

- The action occurs in or within 1,640 feet (500 meters) of a calcareous wetland, fen, sedge meadow or marsh suitable for Hine's Emerald Dragonfly AND will NOT disturb the ground or existing vegetation²
 - OR
- The action does NOT occur in or within 1,640 feet (500 meters) of a calcareous wetland, fen, sedge meadow or marsh suitable for Hine's Emerald Dragonfly
 - AND
- The action does NOT include pesticide application
 - AND
- The action will NOT temporarily or permanently affect local hydrology.

Projects that intersect Hine's Emerald Dragonfly Critical Habitat (CH) may result in a Not Likely to Adversely Affect (NLAA)¹ determination if the following occurs:

- The action does NOT include construction or modification of a road or trail
 - AND
- The action occurs in or within 1,640 feet (500 meters) of a calcareous wetland, fen, sedge meadow or marsh suitable for Hine's Emerald Dragonfly AND the action will NOT disturb the ground or

existing vegetation²

- OR
- The action does NOT occur in or within 1,640 feet (500 meters) of a calcareous wetland, fen, sedge meadow or marsh suitable for Hine's Emerald Dragonfly
 - AND
- The action will NOT temporarily or permanently affect local hydrology.

The main threats to Hine's Emerald Dragonfly are habitat destruction, urban sprawl, off-road vehicles, and road and pipeline construction – all of which result in ground disturbance. Avoiding ground disturbance will preclude direct effects to Hine's Emerald Dragonfly. Avoiding alterations to hydrology will preclude indirect effects.

May Affect

Projects that intersect Hine's Emerald Dragonfly species list area and/or CH and have either determined presence through a survey³ or have not conducted a survey³ will result in a May Affect (MA)⁴ determination if any of the following occurs:

- Disturbance to the ground or existing vegetation² within 500 meters of a calcareous wetland, fen, sedge meadow, or marsh suitable for Hine's Emerald Dragonfly
- Include spraying insecticides
- Affect local hydrology (permanently or temporarily)
- Include construction or modification of a road or trail within CH

Hine's Emerald Dragonfly References

Cobb, M. K., & Bradbury, K. R. (2008). *Delineation of areas contributing groundwater to springs and wetlands supporting the Hine's Emerald Dragonfly, Door County, WI*. Wisconsin Geological and Natural History Survey, University of Wisconsin-Extension: Final report to the Wisconsin Coastal Management Program .

USFWS. (1995, January 26). *Endangered and Threatened Wildlife and Plants; Determination of Endangered Status for the Hine's Emerald Dragonfly (Somatochlora hineana)*. Retrieved from US Federal Register: <https://www.govinfo.gov/content/pkg/FR-1995-01-26/pdf/95-1983.pdf#page=1>

USFWS. (2001, September 27). *Hine's Emerald Dragonfly (Somatochlora hineana Williamson) Recovery Plan*. Retrieved from USFWS ECOS: https://ecos.fws.gov/docs/recovery_plan/hedplan.pdf

USFWS. (2010, April 23). *US Federal Register*. Retrieved from Endangered and Threatened Wildlife and Plants; Final Revised Critical Habitat for Hine's Emerald Dragonfly (Somatochlora hineana): <https://www.govinfo.gov/content/pkg/FR-2010-04-23/pdf/2010-8808.pdf#page=1>

USFWS. (2019, April 30). *Hine's Emerald Dragonfly, Somatochlora hineana (Odonata: Corduliidae) 5-Year Review: Summary and Evaluation*. Retrieved from USFWS ECOS: https://ecos.fws.gov/docs/tess/species_nonpublish/2152.pdf

WDNR. (2020, October 8). Retrieved from Hine's Emerald: <https://dnr.wi.gov/topic/EndangeredResources/Animals.asp?mode=detail&SpecCode=I1ODO32110>

¹NLAA – For projects that reach a “not likely to adversely affect” determination, there is a 30 day “verification period” to allow the USFWS to review the project details and ensure the action meets the criteria for a NLAA determination. Output letters will indicate that if the project proponent does not hear otherwise within that timeframe, the NLAA determination is verified and they can proceed with their action as described in the IPaC report and concurrence verification letter. This verification period allows the USFWS Minnesota Wisconsin Ecological Services Field Office to apply local knowledge to evaluation of the action and ensure actions do not have unanticipated impacts. Thus, there may be a small subset of actions for which the USFWS Minnesota Wisconsin Ecological Services Field Office may request additional information during this timeframe to verify the effects determination reached through the IPaC DKey.

²This includes any off-road vehicle access, soil compaction, digging, seismic survey, directional drilling, heavy equipment, grading, trenching, placement of fill, pesticide application (herbicide, fungicide), vegetation management (including removal or maintenance using equipment or chemicals), cultivation, development, etc.

³Survey guidance is available at: <https://mnfi.anr.msu.edu/species/description/12124/Somatochlora-hineana>

⁴May affect – Further consultation with the USFWS Minnesota Wisconsin Ecological Services Field Office is necessary in order to discern if the activity would result in a “no effect”, “not likely to adversely affect”, or “likely to adversely affect” determination.

Appendix 10 – Karner Blue Butterfly (*Lycaeides melissa samuelis*)

Karner Blue Butterfly Species Summary

The KBB is currently listed by the U.S. Fish and Wildlife Service (USFWS) under the Endangered Species Act (ESA) as ‘endangered’ across its range (USFWS, 1992). Habitat throughout the range of the KBB has been lost because of land development and lack of natural disturbance, primarily wildfire. Such disturbance helps maintain the butterfly's habitat by setting back encroaching forests and encouraging Wild Lupine and other flowering plant growth. Collection of this rare and beautiful butterfly also negatively impacts the species. The USFWS species profile for KBB can be found at <https://ecos.fws.gov/ecp/species/6656>. Additional information can be found at <https://www.fws.gov/species/karner-melissa-blue-lycaeides-melissa-samuelis>. A summary of the ecology of this species can be found in the USFWS KBB recovery plan (USFWS, 2003) and most recent 5-year review (USFWS, 2019). Critical habitat for the KBB was proposed in 1978 but has not yet been designated (USFWS, 1978).

Karner Blue Butterfly Biological Information

The KBB is a small butterfly, with a wingspan of about 1 inch (0.4 centimeters). The male's wings are distinctively marked with a silvery or dark blue color (**Figure 1**). The female is grayish brown, especially on the outer portions of the wings, to blue on the topside, with irregular bands of orange crescents inside the narrow black border (**Figure 2**). The underside of both sexes is gray with a continuous band of orange crescents along the edges of both wings and with scattered black spots circled with white (**Figure 3**).

The KBB usually has 2 generations, and thus 2 flight periods each year. In April, the first group of caterpillars hatch from eggs that were laid the previous year. The pale green caterpillars feed only on Wild Lupine plant leaves while adult KBBs use a variety of forbs for nectar. By about mid-May, the caterpillars pupate and adult butterflies emerge from their cocoon-like chrysalis by the end of May or in early June. These adults mate, laying their eggs in June on or near Wild Lupine plants. The eggs hatch in about one week and the caterpillars feed for about 3 weeks. The caterpillars then pupate and the summer's second generation of adult butterflies appear in July. These adults mate and lay eggs that will not hatch until the following spring.



Figure 1. Male KBB (Katie Goodwin, USFWS)



Figure 2. Female KBB (WDNR, 2022a)



Figure 3. KBB Underwing (WDNR, 2022a)

Karner Blue Butterfly Suitable Habitat

The KBB was historically associated with native barrens and savanna ecosystems but is now found in remnant barrens, oak savannas, gaps within forest stands, young forest stands, trails, and military camps that occur on the landscapes previously occupied by native prairie and savannas (**Figure 4**). KBBs can also be found in other habitats including roadsides, utility rights-of-way, or other areas that are maintained in an open early successional stage (WDNR, 2022b). KBB habitat is a patchwork of pine and scrub oak scattered among open grassy areas. Adults can fly up to about 1.4 miles (2.25 kilometers) across open landscapes.

KBB larvae are dependent upon Wild Lupine, the only known larval food source. Ants tend these plants and appear to protect the caterpillars from some natural enemies. In return, the ants collect nectar from the caterpillar. The KBB is found in the northern range of Wild Lupine habitat that occurs in pine barren and oak savanna habitat (**Figure 5**).



Figure 4. Surveying for KBB in suitable habitat in Wisconsin (WDNR, 2022b)



Figure 5. Wild Lupine habitat, WI (WDNR, 2022b)

The KBB is likely extirpated from Minnesota; however, restoration efforts continue at Whitewater Wildlife Management Area and St. Croix State Park, where Wild Lupine and suitable nectar plants have been historically observed, but there are no current records of occurrence. There are 5 recognized State Recovery Units in Wisconsin: Morainal Sands Unit, Glacial Lake Wisconsin, West Central Driftless, Wisconsin Escarpment and Sandstone Plateau, and Superior Outwash. The Wisconsin Department of Natural Resources (WDNR) conducts surveys and maintains survey records on the majority of the State's larger known KBB occupied sites (USFWS, 2019).

Karner Blue Butterfly Determination Key Guidance

The proposed action is the compilation of many different types of projects that, depending on their size and specific location, often do not significantly affect any federally listed threatened or endangered species or critical habitats in Minnesota and Wisconsin. Common project types include, but are not limited to, the following:

- Vegetation management, including mowing, forestry activities, prescribed burning, and harvest
- Construction, maintenance, operation, and/or removal of:
 - Roads/trails
 - Communication towers
 - Transmission/utility lines
 - Bridges/culverts
 - Oil/gas pipelines
 - Solar power facilities
 - Hydroelectric facilities/ dams
 - Mines/quarries
 - Canals/levees/dikes
- Commercial/residential/recreational developments
- Agricultural activities
- Site/habitat restoration/enhancement
- Shoreline protection/beach nourishment
- Dredging and filling of wetlands/waterbodies
- Military operations

Not Likely to Adversely Affect

Projects that intersect KBB species list area and/or Wisconsin's DNR HPR map¹ may result in a Not Likely to Adversely Affect (NLAA)² determination if:

- The action does NOT occur in suitable habitat.³
- The action occurs in suitable habitat³ AND all of the following apply:
 - does NOT include spraying insecticides
 - will disturb the ground or existing vegetation⁴
 - surveys⁵ for Wild Lupine have been conducted, AND
 - no Wild Lupine was found in the action area.
- The action occurs in suitable habitat³ AND all of the following apply:
 - does NOT include spraying insecticides
 - will NOT disturb the ground or existing vegetation⁴
 - a survey⁵ was conducted and Wild Lupine was present OR known to be present
 - disturbance to Wild Lupine can be avoided AND
 - the action will NOT result in changes to KBB habitat quality, quantity, or availability.⁶

May Affect

Projects that intersect KBB species list area and/or Wisconsin's DNR HPR map¹ may result in a May Affect (MA)⁷ determination if:

- The action occurs in suitable habitat³ AND all of the following apply:
 - does NOT include spraying insecticides
 - will NOT disturb the ground or existing vegetation⁴ AND
 - disturbance to known Wild Lupine⁵ cannot be avoided.
- The action occurs in suitable habitat³ AND all of the following apply:
 - does NOT include spraying insecticides
 - will NOT disturb the ground or existing vegetation⁴
 - disturbance to known Wild Lupine⁵ can be avoided, AND
 - the action will result in changes to KBB habitat quality, quantity, or availability.⁶
- The project involves insecticide application

Karner Blue Butterfly References

Hess, R., & Hess, A. (2015). Conserving Karner Blue Butterflies in Wisconsin. *American Entomologist*, 96-113.

USFWS. (1978, July 3). *Proposed Endangered or Threatened Status with Critical Habitat for Ten Butterflies or Moths*. Retrieved from US Federal Register: <https://www.govinfo.gov/content/pkg/FR-1978-07-03/pdf/FR-1978-07-03.pdf#page=144>

USFWS. (1992, December 14). *Endangered and Threatened Wildlife and Plants; Determination of Endangered Status for the Karner Blue Butterfly*. Retrieved from US Federal Register: <https://www.govinfo.gov/link/fr/57/59236?link-type=pdf>

USFWS. (2003, September). *Karner Blue Butterfly Recovery Plan (Lycaeides melissa samuelis)*. Retrieved from USFWS ECOS: https://ecos.fws.gov/docs/recovery_plan/030919.pdf

- USFWS. (2019, December 17). *Karner Blue Butterfly (Lycaeides melissa samuelis) 5-Year Review: Summary and Evaluation*. Retrieved from USFWS ECOS:
https://ecos.fws.gov/docs/tess/species_nonpublish/2929.pdf
- WDNR. (2022a). *Wing Comparison*. Retrieved from Karner Blue Butterfly:
<https://dnr.wisconsin.gov/topic/endangeredresources/karner/identification.html>
- WDNR. (2022b). *Identification Tips and Habitat Karner Blue Butterfly*. Retrieved from Karner Blue Butterfly: <https://dnr.wisconsin.gov/topic/endangeredresources/karner/identification.html>
- WDNR. (2022c). *High Potential Range in Wisconsin*. Retrieved from Karner Blue Butterfly:
<https://dnr.wisconsin.gov/topic/endangeredresources/karner/range.html>

¹Wisconsin Department of Natural Resources KBB High Potential Range Interactive Map: <https://dnr.wisconsin.gov/topic/endangeredresources/karner/range.html>

²NLAA – For projects that reach a “not likely to adversely affect” determination, there is a 30 day “verification period” to allow the USFWS to review the project details and ensure the action meets the criteria for a NLAA determination. Output letters will indicate that if the project proponent does not hear otherwise within that timeframe, the NLAA determination is verified and they can proceed with their action as described in the IPaC report and concurrence verification letter. This verification period allows the USFWS Minnesota Wisconsin Ecological Services Field Office to apply local knowledge to evaluation of the action and ensure actions do not have unanticipated impacts. Thus, there may be a small subset of actions for which the USFWS Minnesota Wisconsin Ecological Services Field Office may request additional information during this timeframe to verify the effects determination reached through the IPaC DKey.

³This includes a variety of habitats containing Wild Lupine including oak savanna, oak or pine barrens, openings within oak forest (including rights-of-way), or old fields in association with oak forest.

⁴This includes any off-road vehicle access, soil compaction, digging, seismic survey, directional drilling, heavy equipment, grading, trenching, placement of fill, pesticide application (herbicide, fungicide), vegetation management (including removal or maintenance using equipment or prescribed fire), cultivation, development, etc.

⁵KBB survey protocols located here: <https://dnr.wisconsin.gov/topic/endangeredresources/karner/access>

⁶This refers to land management activities including haying, grazing, and prescribed fire; governmental, commercial, or private development; agricultural conversion; allowing habitat to degrade; thinning and/or other timber management and logging practices; road, railroad and utility corridors development; mining activities.

⁷May affect – Further consultation with the USFWS Minnesota Wisconsin Ecological Services Field Office is necessary in order to discern if the activity would result in a “no effect”, “not likely to adversely affect”, or “likely to adversely affect” determination.

Appendix 11 – Leedy’s Roseroot (*Rhodiola integrifolia* ssp. *leedyi*)

Leedy’s Roseroot Species Summary

Leedy’s Roseroot is currently listed by the U.S. Fish and Wildlife Service (USFWS) under the Endangered Species Act (ESA) as ‘threatened’ across its range (USFWS, Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for *Sedum integrifolium* ssp. *leedyi* (Leedy’s roseroot), 1992). Major threats to Leedy’s Roseroot are its low numbers and few populations, its disjunct occurrences, on-site disturbances, and groundwater contamination (USFWS, 1998). Development, heavy rains and poor soil conservation practices are also current threats (USFWS, 2021a). The U.S. Fish and Wildlife Service (USFWS) species profile for Leedy’s Roseroot can be found at <https://ecos.fws.gov/ecp/species/285>. Additional information can be found at <https://fws.gov/species/leedys-roseroot-rhodiola-integrifolia-ssp-leedyi>. A summary of the ecology of this species can be found in the USFWS Leedy’s Roseroot recovery plan (USFWS, 1998) and most recent 5-year review (USFWS, 2021a). No critical habitat has been designated for this species.

Leedy’s Roseroot Biological Information

Leedy’s Roseroot has a relatively elongate, leafy stem. The closely packed leaves arise directly from the main stem and are smooth, with irregularly toothed to toothless edges (**Figures 1 and 2**). Although they are succulent, they can appear limp in dry weather. Male and female flowers are borne on separate plants with small 4 to 5 petaled flowers arranged in dense heads at the end of the leafy stem. Flowers can vary in color from dark red to occasional yellow or orange (USFWS, 2021b) and are insect-pollinated (MNDNR, 2021). Reproduction is usually sexually by seed and less often vegetatively by fragmentation of rhizomes.



Figure 1. Leedy’s Roseroot (Phil Delphey, USFWS)



Figure 2. *Leedy's Roseroot* (Phil Delphey, USFWS)

Leedy's Roseroot Suitable Habitat

In Minnesota, Leedy's Roseroot grows in crevices on north-facing moderate cliffs, which provide a cool, moist microclimate (USFWS, 2021a). These are sites where groundwater seeps through the rock and is cooled by air coming from underground air passages in karst topography (MNDNR, 2021). The dolomite cliffs can be up to 30 meters (98 feet) (**Figure 3**). The best time to search for Leedy's Roseroot is early May to late September when its thick succulent leaves make it easy to identify (MNDNR, 2021).



Figure 3. *Leedy's Roseroot* growing on moderate cliffs (Wayne Ostlie, MNDNR)

Leedy's Roseroot populations are only found in New York, South Dakota, and Minnesota. Four populations of Leedy's Roseroot are found in Fillmore and Olmstead Counties in Minnesota. Three populations are located on private lands (Simpson Cliffs, Deer Creek, and Bear Creek), and one is found in the Whitewater Wildlife Management Area.

Leedy's Roseroot Critical Habitat

Critical habitat has not been designated for Leedy's Roseroot.

Leedy's Roseroot Determination Key Guidance

The proposed action is the compilation of many different types of projects that depending on their size and specific location often do not significantly affect any Federally listed threatened or endangered species or critical habitats in Minnesota and Wisconsin. Common project types include, but are not limited to, the following:

- Vegetation management, including mowing, forestry activities, prescribed burning, and harvest
- Construction, maintenance, operation, and/or removal of:
 - Roads/trails
 - Communication towers
 - Transmission/utility lines
 - Bridges/culverts
 - Oil/gas pipelines
 - Solar power facilities
 - Hydroelectric facilities/ dams
 - Mines/quarries
 - Canals/levees/dikes
- Commercial/residential/recreational developments
- Agricultural activities
- Site/habitat restoration/enhancement
- Shoreline protection/beach nourishment
- Dredging and filling of wetlands/waterbodies
- Military operations

No Effect

Projects that intersect the Leedy's Roseroot species list area may result in a No Effect (NE)¹ determination if both of the following apply:

- A survey was completed, and the Leedy's Roseroot was not detected.
 - Upload the survey results to IPaC. If unable to upload the survey to IPaC, email the survey results to the MNWI ES Field Office (TwinCities@fws.gov).
- The action area occurs in unsuitable habitat.

Not Likely to Adversely Affect

Projects that intersect the Leedy's Roseroot species list area may result in a Not Likely to Adversely Affect (NLAA)² determination if:

- There are restrictions on stream/hydrology-impacting or vegetation/ground-disturbing activities within the species list area/buffered habitat. Restrictions include actions that are likely to change the elevations of surface water upstream or downstream, or in the local groundwater (as estimated pre-action vs. post-action); as well as the potential to impact the riparian zone (up to 200 feet) or indirectly impact a stream or river (e.g., cut and fill, horizontal directional drilling,

construction, vegetation removal, pesticide or fertilizer application, discharge, runoff of sediment or pollutants, increase in erosion).

- Restrictions on actions that may fragment habitat or create barriers to movement/dispersal within the species list area.

May Affect

Projects that intersect the Leedy's Roseroot species list area and have either determined presence through a survey or have not conducted a survey will result in a May Affect (MA)³ determination if any of the following occurs:

- Suitable habitat is present
- Suitable habitat is present in the surrounding area
- There are known elemental occurrences⁴ in the action area/surrounding area
- There is evidence of habitat fragmentation in the action area/surrounding area
- The action occurs during flowering season
- Wetland delineation or habitat assessment/survey suggest presence of the species
- The species is observed during a site visit or there are reports of presence
- Disturbance of the ground or existing vegetation⁵
- Indirect alteration of the habitat or resources of the listed plant(s)⁶
- Direct harm to the listed plant(s)⁷

Leedy's Roseroot References

- MNDNR. (2021). *Rhodiola integrifolia ssp. leedyi* (Rosendahl & Moore) Kartesz Leedy's Roseroot. Retrieved from Minnesota Department of Natural Resources: <https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=PDCRA0A0H2>
- USFWS. (1992, April 22). *Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for Sedum integrifolium ssp. leedyi* (Leedy's roseroot). Retrieved from US Federal Register: https://ecos.fws.gov/docs/federal_register/fr2032.pdf
- USFWS. (1998, September 25). *Leedy's Roseroot Recovery Plan (Sedum intergrifolium ssp. leedyi)*. Retrieved from USFWS ECOS: https://ecos.fws.gov/docs/recovery_plan/980925.pdf
- USFWS. (2021a, May 21). *5-Year Review Leedy's Roseroot (Rhodiola integrifolia ssp. leedyi)*. Retrieved from USFWS ECOS: https://ecos.fws.gov/docs/tess/species_nonpublish/969.pdf
- USFWS. (2021b). *Leedy's roseroot (Rhodiola integrifolia ssp. leedyi)*. Retrieved from USFWS ECOS: <https://ecos.fws.gov/ecp/species/285>

¹No effect – The proposed project would result in no effect to this species and/or its federally designated critical habitat (if applicable). Further consultation with the USFWS Minnesota Wisconsin Ecological Services Field Office is not necessary for the project as described.

²NLAA – For projects that reach a “not likely to adversely affect” determination, there is a 30 day “verification period” to allow the USFWS to review the project details and ensure the action meets the criteria for a NLAA determination. Output letters will indicate that if the project proponent does not hear otherwise within that timeframe, the NLAA determination is verified and they can proceed with their action as described in the IPaC report and concurrence verification letter. This verification period allows the USFWS Minnesota Wisconsin Ecological Services Field Office to apply local knowledge to evaluation of the action and ensure actions do not have unanticipated impacts. Thus, there may be a small subset of actions for which the USFWS Minnesota Wisconsin Ecological Services Field Office may request additional information during this timeframe to verify the effects determination reached through the IPaC DKey.

³May affect – Further consultation with the USFWS Minnesota Wisconsin Ecological Services Field Office is necessary in order to discern if the activity would result in a “no effect”, “not likely to adversely affect”, or “likely to adversely affect” determination.

⁴Elemental occurrence data can be accessed from the Wisconsin Natural Heritage Inventory: <https://dnr.wisconsin.gov/topic/NHI> and the Minnesota Department of Natural Resources Natural Heritage Information System: <https://www.dnr.state.mn.us/nhnrp/nhis.html>

⁵This includes any off-road vehicle access, soil compaction, digging, seismic survey, directional drilling, heavy equipment, grading, trenching, placement of fill, pesticide application (herbicide, fungicide), vegetation management (including removal or maintenance using equipment or chemicals), cultivation, development, etc.

⁶For example, actions that cause a change in canopy cover, microclimate, humidity, increase in invasive species, hydrologic alterations, etc.

⁷For example, through mowing/haying, prescribed fire, herbicide application, trampling, increased herbivory, cutting/clearing, cultivation, crushing by vehicle, reduction to possession, etc.

Appendix 12 – Mead’s Milkweed (*Asclepias meadii*)

Mead’s Milkweed Species Summary

Mead’s Milkweed is currently listed by the U.S. Fish and Wildlife Service (USFWS) under the Endangered Species Act (ESA) as ‘threatened’ across its range (USFWS, 1988). Threats to Mead’s Milkweed habitat include urbanization, land conversion to agriculture, habitat fragmentation, lack of prescribed fire, habitat destruction from feral hogs, pesticide, and herbicide application (USFWS, 2012). Mowing of prairie habitat for haying reduces Mead’s Milkweed seed production and results in reduced genetic diversity (USFWS, 2012). The USFWS species profile for Mead’s Milkweed can be found at <https://ecos.fws.gov/ecp/species/8204>. Additional information can be found at <https://fws.gov/species/meads-milkweed-asclepias-meadii>. A summary of the ecology of this species can be found in the USFWS Mead’s Milkweed recovery plan (USFWS, 2003) and most recent 5-year review (USFWS, 2012). No critical habitat has been designated for this species.

Mead’s Milkweed Biological Information

Mead’s Milkweed has a single, slender, unbranched stalk, 8 to 16 inches (20 to 40.5 centimeters (cm)) high, without hairs but with a whitish, waxy covering. The hairless leaves are opposite, broadly ovate, 2 to 3 (0.5 to 7.5 cm) inches long, 3/8 to 2 inches (2 to 5 cm) wide, also with a whitish, waxy covering (**Figure 1**). A solitary umbel (an umbrella-like cluster of flowers) at the top of the stalk has 6 to 15 greenish, cream-colored flowers.

Mead’s Milkweed is a long-lived perennial herb. Studies suggest that it may take 15 years or more to mature from a germinating seed to a flowering plant. After maturing, it can persist indefinitely.

Mead’s Milkweed flowers as early as late May in the south through mid to late June in the north. It is pollinated by small bumblebees and miner bees. Young green fruit pods appear by late June and reach their maximum length of 1.5 to 4 inches (3.8 to 10.2 cm) by late August or early September. The hairy seeds within these pods mature by mid-October. Mead’s Milkweed spreads vegetatively through underground stems called rhizomes, which form new roots and stems from their nodes (USFWS, 2005).



Figure 1. *Mead's Milkweed* (Mike Redmer, USFWS)

Mead's Milkweed Suitable Habitat

Mead's Milkweed requires moderately wet (mesic) to moderately dry (dry mesic) upland tallgrass prairie or glade/barren habitat characterized by vegetation adapted for drought and fire, but also occurs in hay meadows. These habitat types are generally found between 800 and 1,200 feet (243 and 366 meters(m)) above sea level on slopes less than 20 percent (USFWS, 2003).

Northern populations generally grow on calcareous, nutrient-rich soils (Bowles, McBride, & Betz, 1998). One population in Wisconsin was found in the driftless area in loess over dolomite (USFWS, 2003). On deep silt-loam soils, it can be found growing in association with grasses such as Big Bluestem, Indian Grass, Prairie Dropseed, and with prairie forbs such as Purple Prairie-clover, White Prairie-clover, and Prairie Gentian (USDA, 2015) (**Figure 2**). The species is generally restricted to full sun but can be found in partial shade such as in the edges of glades or barrens (USFWS, 2003).



Figure 2. *Mead's Milkweed* flowering on the Salac Prairie, Manhattan, Kansas (John M. Row, USDA NRCS)

Mead's Milkweed was extirpated from Wisconsin but has been reintroduced (USFWS, 2005). Introductions began in 2001 with 11 introductions at 7 restoration sites (USFWS, 2003) in the Till Plains physiographic region (USFWS, 2012). At the time of the latest 5-year review (USFWS, 2012), no flowering has been observed at the Wisconsin introductions. Mead's Milkweed grows slowly and rarely reproduces, so it may take decades for the introduced populations to be viable (USFWS, 2012).

Mead's Milkweed Critical Habitat

Critical habitat has not been designated for Mead's Milkweed.

Mead's Milkweed Determination Key Guidance

The proposed action is the compilation of many different types of projects that, depending on their size and specific location, often do not significantly affect any Federally listed threatened or endangered species or critical habitats in Minnesota and Wisconsin. Common project types include, but are not limited to, the following:

- Vegetation management, including mowing, forestry activities, prescribed burning, and harvest
- Construction, maintenance, operation, and/or removal of:
 - Roads/trails
 - Communication towers
 - Transmission/utility lines
 - Bridges/culverts
 - Oil/gas pipelines
 - Solar power facilities
 - Hydroelectric facilities/ dams
 - Mines/quarries
 - Canals/levees/dikes
- Commercial/residential/recreational developments
- Agricultural activities
- Site/habitat restoration/enhancement
- Shoreline protection/beach nourishment
- Dredging and filling of wetlands/waterbodies
- Military operations

No Effect

Projects that intersect the Mead's Milkweed species list area may result in a No Effect (NE)¹ determination if both of the following apply:

- A survey was completed, and the Mead's Milkweed was not detected.
 - Upload the survey results to IPaC. If unable to upload the survey to IPaC, email the survey results to the MNWI ES Field Office (TwinCities@fws.gov).
- The action area occurs in unsuitable habitat.

Not Likely to Adversely Affect

Projects that intersect Mead's Milkweed species list area may result in a Not Likely to Adversely Affect (NLAA)² determination if:

- There are restrictions on stream/hydrology-impacting or vegetation/ground-disturbing activities within the species list area/buffered habitat. Restrictions include actions that are likely to change the elevations of surface water upstream or downstream, or in the local groundwater (as estimated pre-action vs. post-action); as well as the potential to impact the riparian zone (up to 200 feet) or indirectly impact a stream or river (e.g., cut and fill, horizontal directional drilling,

construction, vegetation removal, pesticide or fertilizer application, discharge, runoff of sediment or pollutants, increase in erosion).

- Restrictions on actions that may fragment habitat or create barriers to movement/dispersal within the species list area.

May Affect

Projects that intersect Mead's Milkweed species list area and have either determined presence through a survey or have not conducted a survey will result in a May Affect (MA)³ determination if any of the following occurs:

- Suitable habitat is present
- Suitable habitat is present in the surrounding area
- There are known elemental occurrences⁴ in the action area/surrounding area
- There is evidence of habitat fragmentation in the action area/surrounding area
- The action occurs during flowering season
- Wetland delineation or habitat assessment/survey suggest presence of the species
- The species is observed during a site visit or there are reports of presence
- Disturbance of the ground or existing vegetation⁵
- Indirect alteration of the habitat or resources of the listed plant(s)⁶
- Direct harm to the listed plant(s)⁷

Mead's Milkweed References

Bowles, M. L., McBride, J. L., & Betz, R. F. (1998). Management and Restoration Ecology of the Federal Threatened Mead's Milkweed, *Asclepias meadii* (Asclepiadaceae). *Annals of the Missouri Botanical Garden*, 110-125.

USDA. (2015). *Natural Resource Conservation Service Plant Guide*. Retrieved from Mead's Milkweed *Asclepias meadii* Torr. ex A. Gray Plant Symbol = ASME:
https://www.nrcs.usda.gov/Internet/FSE_PLANTMATERIALS/publications/kspmcpg12872.pdf

USFWS. (1988, September 1). *Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for Asclepias Meadii (Mead's Milkweed)*. Retrieved from US Federal Register:
<https://www.govinfo.gov/content/pkg/FR-1988-09-01/pdf/FR-1988-09-01.pdf#page=200>

USFWS. (2003, September 16). *Mead's Milkweed (Asclepias meadii) Recovery Plan*. Retrieved from USFWS ECOS: https://ecos.fws.gov/docs/recovery_plan/030922b.pdf

USFWS. (2005, June). *Midwest Region Endangered Species*. Retrieved from Mead's Milkweed (*Asclepias meadii*) Fact Sheet: <https://www.fws.gov/midwest/endangered/plants/pdf/meads-fs.pdf>

USFWS. (2012, November 11). *Mead's Milkweed (Asclepias meadii) 5-Year Review: Summary and Evaluation*. Retrieved from USFWS ECOS:
https://ecos.fws.gov/docs/tess/species_nonpublish/2158.pdf

WDNR. (2021, May 5). *Species Guidance*. Retrieved from Fassett's Locoweed (*Oxytropis campestris* var. *chartacea*):
<https://dnr.wi.gov/topic/EndangeredResources/Plants.asp?mode=detail&SpecCode=PDFAB2X041>

¹No effect – The proposed project would result in no effect to this species and/or its federally designated critical habitat (if applicable). Further consultation with the USFWS Minnesota Wisconsin Ecological Services Field Office is not necessary for the project as described.

²NLAA – For projects that reach a “not likely to adversely affect” determination, there is a 30 day “verification period” to allow the USFWS to review the project details and ensure the action meets the criteria for a NLAA determination. Output letters will indicate that if the project proponent does not hear otherwise within that timeframe, the NLAA determination is verified and they can proceed with their action as described in the IPaC report and concurrence verification letter. This verification period allows the USFWS Minnesota Wisconsin Ecological Services Field Office to apply local knowledge to evaluation of the action and ensure actions do not have unanticipated impacts. Thus, there may be a small subset of actions for which the USFWS Minnesota Wisconsin Ecological Services Field Office may request additional information during this timeframe to verify the effects determination reached through the IPaC Dkey.

³May affect – Further consultation with the USFWS Minnesota Wisconsin Ecological Services Field Office is necessary in order to discern if the activity would result in a “no effect”, “not likely to adversely affect”, or “likely to adversely affect” determination.

⁴Elemental occurrence data can be accessed from the Wisconsin Natural Heritage Inventory: <https://dnr.wisconsin.gov/topic/NHI> and the Minnesota Department of Natural Resources Natural Heritage Information System: <https://www.dnr.state.mn.us/nhnrp/nhis.html>

⁵This includes any off-road vehicle access, soil compaction, digging, seismic survey, directional drilling, heavy equipment, grading, trenching, placement of fill, pesticide application (herbicide, fungicide), vegetation management (including removal or maintenance using equipment or chemicals), cultivation, development, etc.

⁶For example, actions that cause a change in canopy cover, microclimate, humidity, increase in invasive species, hydrologic alterations, etc.

⁷For example, through mowing/haying, prescribed fire, herbicide application, trampling, increased herbivory, cutting/clearing, cultivation, crushing by vehicle, reduction to possession, etc.

Appendix 13 – Minnesota Dwarf Trout Lily (*Erythronium propullans*)

Minnesota Dwarf Trout Lily Species Summary

The Minnesota Dwarf Trout Lily is currently listed by the U.S. Fish and Wildlife Service (USFWS) under the Endangered Species Act (ESA) as ‘endangered’ across its range (USFWS, 1986). The Minnesota Dwarf Trout Lily is Minnesota’s only endemic plant species (USFWS, 1987). Major threats to the species are development and land conversion to agriculture (USFWS, 1987), logging, incompatible recreational uses, the spread of exotic species, and extreme weather events (USFWS, 2021). The USFWS species profile for Minnesota Dwarf Trout Lily can be found at <https://ecos.fws.gov/ecp/species/597>. Additional information on the species can be found at <https://www.fws.gov/species/minnesota-fawnlily-erythronium-propullans>. A summary of the ecology of this species can be found in the USFWS Minnesota Dwarf Trout Lily recovery plan (USFWS, 1987) and most recent 5-year review (USFWS, 2021). No critical habitat has been designated for this species.

Minnesota Dwarf Trout Lily Biological Information

There are three species of trout lily in Minnesota: the Minnesota Dwarf Trout Lily, the White Trout Lily (*Erythronium albidum*), and the Yellow Trout Lily (*Erythronium americanum*). All three species have tapering green leaves lightly mottled with a greyish-white pattern (**Figure 1**). Large patches of leaves with few flowers are characteristic of trout lilies and are common in all three species. The leaves of White Trout Lilies and Minnesota Dwarf Trout Lilies are similar and often overlap in size. Therefore, it is difficult to distinguish between species in large masses of leaves without flowers (MNDNR, Minnesota Dwarf Trout Lily, 2020).

The Minnesota Dwarf Trout Lily is a forest wildflower found in the woodlands of southeastern Minnesota in the Cannon River Valley (MNDNR, Minnesota Dwarf Trout Lily, 2020). It is a spring ephemeral that blooms in early spring when sunlight reaches the forest floor before deciduous trees fully leaf out (USFWS, 2021). When summer shade darkens the forest floor these plants have already bloomed, generated their food reserves for the coming year, and lost their leaves. Flowering Minnesota Dwarf Trout Lilies are distinguished by the small size of their flowers. Flowers of the Minnesota Dwarf Trout Lily are about the size of a dime or less, pale pink, white or lavender, with a variable number of perianth parts ("petals"). Most members of the lily family have 6 "petals", but Minnesota Dwarf Trout Lilies may have four, five or six (**Figure 2**). Typically, Minnesota Dwarf Trout Lily pedicels ("stems") are about the width of a pencil line, whereas those of White Trout Lilies are approximately 1 millimeter wide (closer to the diameter of string or a rubber band). Flowering of Minnesota Dwarf Trout Lily occurs from mid to late April to mid-May (USFWS, 1987).



Figure 1. Minnesota Dwarf Trout Lily (Phil Delphey, USFWS)

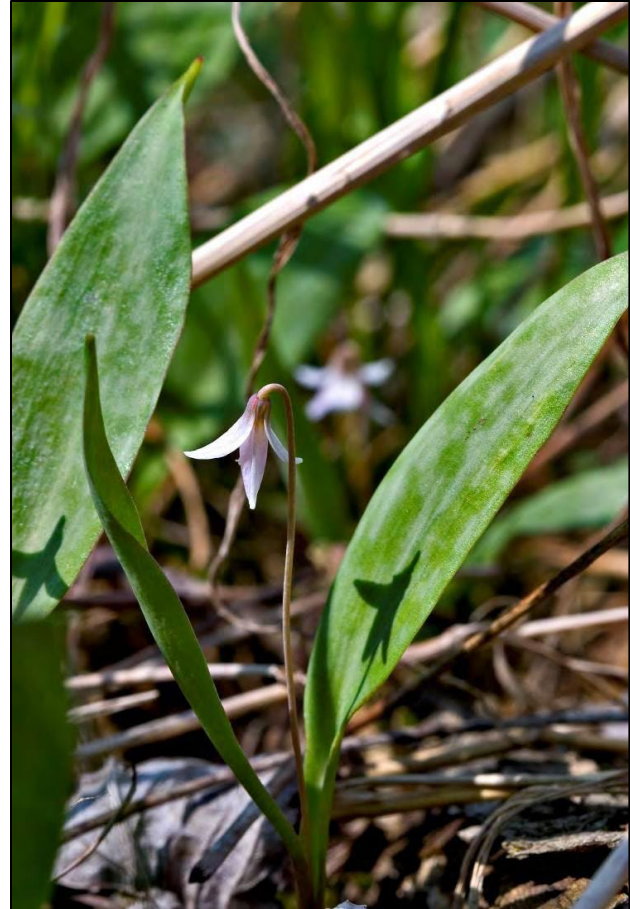


Figure 2. Minnesota Dwarf Trout Lily (Gary Hagemeister, USFWS)

Minnesota Dwarf Trout Lily Suitable Habitat

The Minnesota Dwarf Trout Lily occurs on rich north facing slopes 49.2 to 88.6 feet (15 to 27 meters) high (USFWS, 1987) dominated by maple-basswood stands and adjoining floodplains dominated by lowland hardwoods (USFWS, 2011). American Elm, Box Elder, Sugar Maple, and American Basswood are the dominant tree species on slopes and Green Ash, Red Elm, Eastern Hackberry and American Basswood typically dominate lowland habitats (USFWS, 2011). They are occasionally found on east and west-facing slopes in ravines. In the floodplains, they are typically found on the more terrace-like area where there is less active disturbance from flooding (**Figure 3**). The species distribution is related to the distribution of Decorah shale as the underlying bedrock layer (USFWS, 2021). The species can grow on sandy and almost gravelly soil but appear to grow best on a surface layer of rich, black, well-aerated soil (USFWS, 1987).



Figure 3. Somerset Wildlife Management Area, Steele County, MN (D.S. Wovcha, MN DNR)

Minnesota Dwarf Trout Lily populations are restricted to the Straight River, Cannon River, Little Cannon River, Zumbro River and Prairie Creek watersheds in southeastern Minnesota (USFWS, 2021). About half of the known populations occur on public lands where they are protected, and the remainder occur on private lands where many are voluntarily protected by landowners (USFWS, 2020).

The Minnesota Dwarf Trout Lily only occurs in Rice, Goodhue, and Steele counties.

Minnesota Dwarf Trout Lily Critical Habitat

Critical habitat has not been designated for the Minnesota Dwarf Trout Lily.

Minnesota Dwarf Trout Lily Determination Key Guidance

The proposed action is the compilation of many different types of projects that depending on their size and specific location often do not significantly affect any Federally listed threatened or endangered species or critical habitats in Minnesota and Wisconsin. Common project types include, but are not limited to, the following:

- Vegetation management, including mowing, forestry activities, prescribed burning, and harvest
- Construction, maintenance, operation, and/or removal of:
 - Roads/trails
 - Communication towers
 - Transmission/utility lines
 - Bridges/culverts
 - Oil/gas pipelines
 - Solar power facilities
 - Hydroelectric facilities/ dams
 - Mines/quarries
 - Canals/levees/dikes

- Commercial/residential/recreational developments
- Agricultural activities
- Site/habitat restoration/enhancement
- Shoreline protection/beach nourishment
- Dredging and filling of wetlands/waterbodies
- Military operations

No Effect

Projects that intersect the Minnesota Dwarf Trout Lily species list area may result in a No Effect (NE)¹ determination if:

- A survey² was completed and no Minnesota Dwarf Trout Lily was detected.
 - Upload the survey² results to IPaC. If unable to upload the survey² to IPaC, email the survey results to the MNWI ES Field Office (TwinCities@fws.gov).
- The action area occurs in unsuitable habitat (e.g., actively cultivated field, developed land, ponded, or pooled areas).

Not Likely to Adversely Affect

Projects that intersect the Minnesota Dwarf Trout Lily species list area may result in a Not Likely to Adversely Affect (NLAA)³ determination if:

- There are restrictions on stream/hydrology-impacting or vegetation/ground-disturbing activities within the species list area/buffered habitat. Restrictions include actions that are likely to change the elevations of surface water upstream or downstream, or in the local groundwater (as estimated pre-action vs. post-action); as well as the potential to impact the riparian zone (up to 200 feet) or indirectly impact a stream or river (e.g., cut and fill, horizontal directional drilling, construction, vegetation removal, pesticide or fertilizer application, discharge, runoff of sediment or pollutants, increase in erosion).
- Restrictions on actions that may fragment habitat or create barriers to movement/dispersal within the species list area.

May Affect

Projects that intersect the Minnesota Dwarf Trout Lily species list area and have either determined presence through a survey² or have not conducted a survey will result in a May Affect (MA)⁴ determination if any of the following occurs:

- Suitable habitat is present
- Suitable habitat is present in the surrounding area
- There are known elemental occurrences⁵ in the action area/surrounding area
- There is evidence of habitat fragmentation in the action area/surrounding area
- The action occurs during flowering season
- Wetland delineation or habitat assessment/survey suggest presence of the species
- The species is observed during a site visit or there are reports of presence
- Disturbance of the ground or existing vegetation⁶
- Indirect alteration of the habitat or resources of the listed plant(s)⁷
- Direct harm to the listed plant(s)⁸

Minnesota Dwarf Trout Lily References

- MNDNR. (2020, January 9). *Minnesota Dwarf Trout Lily*. Retrieved from Minnesota Department of Natural Resources Endangered Species Program:
<https://www.fws.gov/midwest/twincities/te/plants/mdtl/index.html>
- USFWS. (1986, March 26). *Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for Erythronium Propullans (Minnesota Trout Lily)*. Retrieved from US Federal Register:
https://ecos.fws.gov/docs/federal_register/fr1100.pdf
- USFWS. (1987, December 16). *Minnesota Trout Lily Recovery Plan*. Retrieved from USFWS ECOS:
https://ecos.fws.gov/docs/recovery_plan/060309c.pdf
- USFWS. (2011, August 24). *Minnesota Dwarf Trout Lily (Erythronium propullans) 5-Year Review: Summary and Evaluation*. Retrieved from USFWS ECOS:
https://ecos.fws.gov/docs/tess/species_nonpublish/1775.pdf
- USFWS. (2019, May 29). *Minnesota Dwarf Trout Lily (Erythronium propullans) Fact Sheet*. Retrieved from USFWS Midwest Region Endangered Species:
<https://www.fws.gov/midwest/endangered/plants/dwarfTRO.html>
- USFWS. (2020, January 9). *Endangered Species Program Minnesota Dwarf Trout Lily*. Retrieved from USFWS Minnesota Wisconsin Ecological Services Field Office:
<https://www.fws.gov/midwest/twinCities/te/plants/mdtl/index.html>
- USFWS. (2021, May 25). *Minnesota Dwarf Trout Lily (Erythronium propullans) 5-Year Review: Summary and Evaluation*. Retrieved from USFWS ECOS:
https://ecos.fws.gov/docs/tess/species_nonpublish/970.pdf

¹No effect – The proposed project would result in no effect to this species and/or its federally designated critical habitat (if applicable). Further consultation with the USFWS Minnesota Wisconsin Ecological Services Field Office is not necessary for the project as described.

²Surveys need to be done during peak anthesis (roughly a 2 to 3-week period) in the spring. The exact dates shift depending on the season but could range anywhere from April 1 to May 15. Only plants that are flowering or in fruit can be counted as a Minnesota Dwarf Trout Lily -- the morphology of vegetative plants are indistinguishable from the common White Trout Lily.

³NLAA – For projects that reach a “not likely to adversely affect” determination, there is a 30 day “verification period” to allow the USFWS to review the project details and ensure the action meets the criteria for a NLAA determination. Output letters will indicate that if the project proponent does not hear otherwise within that timeframe, the NLAA determination is verified, and they can proceed with their action as described in the IPaC report and concurrence verification letter. This verification period allows the USFWS Minnesota Wisconsin Ecological Services Field Office to apply local knowledge to evaluation of the action and ensure actions do not have unanticipated impacts. Thus, there may be a small subset of actions for which the USFWS Minnesota Wisconsin Ecological Services Field Office may request additional information during this timeframe to verify the effects determination reached through the IPaC DKey.

⁴May affect – Further consultation with the USFWS Minnesota Wisconsin Ecological Services Field Office is necessary in order to discern if the activity would result in a “no effect”, “not likely to adversely affect”, or “likely to adversely affect” determination.

⁵Elemental occurrence data can be accessed from the Wisconsin Natural Heritage Inventory: <https://dnr.wisconsin.gov/topic/NHI> and the Minnesota Department of Natural Resources Natural Heritage Information System: <https://www.dnr.state.mn.us/nhnrp/nhis.html>

⁶This includes any off-road vehicle access, soil compaction, digging, seismic survey, directional drilling, heavy equipment, grading, trenching, placement of fill, pesticide application (herbicide, fungicide), vegetation management (including removal or maintenance using equipment or chemicals), cultivation, development, etc.

⁷For example, actions that cause a change in canopy cover, microclimate, humidity, increase in invasive species, hydrologic alterations, etc.

⁸For example, through mowing/haying, prescribed fire, herbicide application, trampling, increased herbivory, cutting/clearing, cultivation, crushing by vehicle, reduction to possession, etc.

Appendix 14 – Northern Wild Monkshood (*Aconitum noveboracense*)

Northern Wild Monkshood Species Summary

Northern Wild Monkshood is currently listed by the U.S. Fish and Wildlife Service (USFWS) under the Endangered Species Act (ESA) as ‘threatened’ across its range (USFWS, 1978). Threats to Northern Wild Monkshood include contamination and filling of sinkholes, grazing and trampling by livestock, human foot traffic, erosion, logging, maintenance of highways and powerlines, misapplication of pesticides, quarrying, and road building (USFWS, 2019). The USFWS species profile for Northern Wild Monkshood can be found at <https://ecos.fws.gov/ecp/species/1450>. Additional information can be found at <https://www.fws.gov/species/northern-wild-monkshood-aconitum-noveboracense>. A summary of the ecology of this species can be found in the USFWS Northern Wild Monkshood recovery plan (USFWS, 1983). No critical habitat has been designated for this species.

Northern Wild Monkshood Biological Information

Northern Wild Monkshood is a perennial plant noted for its distinctive, dark purple to blue (occasionally white) hood-shaped flowers (**Figures 1 and 2**). The inflorescence axis has pedicels with straight, spreading hairs approximately 0.04 inches (1 millimeter (mm)) in length. The flowers are about 1 inch (2.5 centimeters (cm)) in length, and a single stem may have many flowers. Stems range from about 1 to 4 feet (30 to 122 cm) in length. The leaves are broad and palmately divided into 5 to 7 coarse, toothed lobes (USFWS, 2019). Cauline leaves become smaller moving upward on the plant (WDNR, 2021).

Northern Wild Monkshood reproduces from both seed and small tubers. The flowers bloom between June and September and are pollinated when bumblebees pry open the blossoms to collect nectar and pollen (USFWS, 2019). Fruits have a follicle with 3 carpels, dehiscent with each carpel opening along one seam at maturity. Fruiting occurs from August to September, and the optimal identification period for this species is late June through August (WDNR, 2021).



Figure 1. Northern Wild Monkshood (USFWS, 2019)



Figure 2. Northern Wild Monkshood (Kitty Kohout, WDNR)

Northern Wild Monkshood Suitable Habitat

Northern Wild Monkshood is typically found on shaded to partially shaded sandstone cliffs, algific talus slopes, or on cool, streamside sites (**Figure 3**). These areas have cool soil conditions, cold air drainage, or cold groundwater flowage. On algific talus slopes, these conditions are caused by the outflow of cool air and water from ice contained in underground fissures. These fissures are connected to sinkholes and are a conduit for the air flows (USFWS, 2019). Moist, moss ledges and cliff bases with moist, slightly acidic soils on sandstone are typical habitats (WDNR, 2021).



Figure 3. Northern Wild Monkshood suitable habitat (USFWS)

In Wisconsin, Northern Wild Monkshood is restricted to Grant, Monroe, Richland, Sauk, and Vernon counties.

Northern Wild Monkshood Critical Habitat

Critical habitat has not been designated for Northern Wild Monkshood.

Northern Wild Monkshood Determination Key Guidance

The proposed action is the compilation of many different types of projects that, depending on their size and specific location, often do not significantly affect any Federally listed threatened or endangered species or critical habitats in Minnesota and Wisconsin. Common project types include, but are not limited to, the following:

- Vegetation management, including mowing, forestry activities, prescribed burning, and harvest
- Construction, maintenance, operation, and/or removal of:
 - Roads/trails
 - Communication towers
 - Transmission/utility lines
 - Bridges/culverts

- Oil/gas pipelines
- Solar power facilities
- Hydroelectric facilities/ dams
- Mines/quarries
- Canals/levees/dikes
- Commercial/residential/recreational developments
- Agricultural activities
- Site/habitat restoration/enhancement
- Shoreline protection/beach nourishment
- Dredging and filling of wetlands/waterbodies
- Military operations

No Effect

Projects that intersect the Northern Wild Monkshood species list area may result in a No Effect (NE)¹ determination if both of the following apply:

- A survey was completed and the Northern Wild Monkshood was not detected.
 - Upload the survey results to IPaC. If unable to upload the survey to IPaC, email the survey results to the MNWI ES Field Office (TwinCities@fws.gov).
- The action area occurs in unsuitable habitat.

Not Likely to Adversely Affect

Projects that intersect Northern Wild Monkshood species list area may result in a Not Likely to Adversely Affect (NLAA)² determination if:

- There are restrictions on stream/hydrology-impacting or vegetation/ground-disturbing activities within the species list area/buffered habitat. Restrictions include actions that are likely to change the elevations of surface water upstream or downstream, or in the local groundwater (as estimated pre-action vs. post-action); as well as the potential to impact the riparian zone (up to 200 feet) or indirectly impact a stream or river (e.g., cut and fill, horizontal directional drilling, construction, vegetation removal, pesticide or fertilizer application, discharge, runoff of sediment or pollutants, increase in erosion).
- Restrictions on actions that may fragment habitat or create barriers to movement/dispersal within the species list area.

May Affect

Projects that intersect Northern Wild Monkshood species list area and have either determined presence through a survey or have not conducted a survey will result in a May Affect (MA)³ determination if any of the following occurs:

- Suitable habitat is present
- Suitable habitat is present in the surrounding area
- There are known elemental occurrences⁴ in the action area/surrounding area
- There is evidence of habitat fragmentation in the action area/surrounding area
- The action occurs during flowering season
- Wetland delineation or habitat assessment/survey suggest presence of the species
- The species is observed during a site visit or there are reports of presence
- Disturbance of the ground or existing vegetation⁵

- Indirect alteration of the habitat or resources of the listed plant(s)⁶
- Direct harm to the listed plant(s)⁷

Northern Wild Monkshood References

USFWS. (1978, April 26). *Final Determination that Eleven Plant Taxa are Endangered and Two Plant Taxa are Threatened Species*. Retrieved from US Federal Register:
<https://www.govinfo.gov/content/pkg/FR-1978-04-26/pdf/FR-1978-04-26.pdf#page=134>

USFWS. (1983, September 23). *Recovery Plan for Northern Monkshood (Aconitum noveboracense)*. Retrieved from USFWS ECOS: https://ecos.fws.gov/docs/recovery_plan/830923.pdf

USFWS. (2019, May 29). *Northern Monkshood (Aconitum noveboracense) Factsheet*. Retrieved from Midwest Region Endangered Species:
<https://www.fws.gov/midwest/endangered/plants/pdf/acnofctsht.pdf>

USFWS. (2021). *MN WI DKey Standing Analysis Draft*.

WDNR. (2021, May 5). Retrieved from Northern Monkshood (*Aconitum noveboracense*):
<https://dnr.wi.gov/topic/EndangeredResources/Plants.asp?mode=detail&SpecCode=PDRAN01070>

¹No effect – The proposed project would result in no effect to this species and/or its federally designated critical habitat (if applicable). Further consultation with the USFWS Minnesota Wisconsin Ecological Services Field Office is not necessary for the project as described.

²NLAA – For projects that reach a “not likely to adversely affect” determination, there is a 30 day “verification period” to allow the USFWS to review the project details and ensure the action meets the criteria for a NLAA determination. Output letters will indicate that if the project proponent does not hear otherwise within that timeframe, the NLAA determination is verified and they can proceed with their action as described in the IPaC report and concurrence verification letter. This verification period allows the USFWS Minnesota Wisconsin Ecological Services Field Office to apply local knowledge to evaluation of the action and ensure actions do not have unanticipated impacts. Thus, there may be a small subset of actions for which the USFWS Minnesota Wisconsin Ecological Services Field Office may request additional information during this timeframe to verify the effects determination reached through the IPaC Dkey.

³May affect – Further consultation with the USFWS Minnesota Wisconsin Ecological Services Field Office is necessary in order to discern if the activity would result in a “no effect”, “not likely to adversely affect”, or “likely to adversely affect” determination.

⁴Elemental occurrence data can be accessed from the Wisconsin Natural Heritage Inventory: <https://dnr.wisconsin.gov/topic/NHI> and the Minnesota Department of Natural Resources Natural Heritage Information System: <https://www.dnr.state.mn.us/nhnrp/nhis.html>

⁵This includes any off-road vehicle access, soil compaction, digging, seismic survey, directional drilling, heavy equipment, grading, trenching, placement of fill, pesticide application (herbicide, fungicide), vegetation management (including removal or maintenance using equipment or chemicals), cultivation, development, etc.

⁶For example, actions that cause a change in canopy cover, microclimate, humidity, increase in invasive species, hydrologic alterations, etc.

⁷For example, through mowing/haying, prescribed fire, herbicide application, trampling, increased herbivory, cutting/clearing, cultivation, crushing by vehicle, reduction to possession, etc.

Appendix 15 – Northern Long-eared Bat (*Myotis septentrionalis*)

****The Northern Long-eared Bat is not covered by this Determination Key because it has its own standalone Determination Key. This Appendix is for informational purposes only****

Northern Long-eared Bat Species Summary

The NLEB is currently listed by the U.S. Fish and Wildlife Service (USFWS) under the Endangered Species Act (ESA) as ‘threatened’ across its range (USFWS, 2015). The USFWS announced a proposal to reclassify the NLEB as ‘endangered’ on March 22, 2022, because the species faces extinction due to the range-wide impacts of white-nose syndrome (<https://www.whitenosesyndrome.org/>), a deadly disease affecting bats across the continent (USFWS, 2022b). Other threats include wind turbines, habitat loss, fragmentation, and climate change.

The USFWS species profile for the NLEB can be found at <https://ecos.fws.gov/ecp/species/9045>. Additional information can be found at <https://www.fws.gov/species/northern-long-eared-bat-myotis-septentrionalis>. A summary of the ecology of this species can be found in the USFWS NLEB Species Status Assessment (USFWS, 2022a). Critical habitat (CH) for the NLEB has not been designated (USFWS, 2016a). A 4(d) rule has been established for the NLEB (USFWS, 2016b).

Northern Long-eared Bat Biological Information

NLEB body length ranges from 3.0 to 3.7 inches (in) (77 to 95 millimeters [mm]), tail length between 1.3 to 1.6 in (35 and 42 mm), forearm length between 1.3 to 1.5 in (34 and 38 mm), and wingspread between 8.9 to 10.2 in (228 and 258 mm). The NLEB’s adult body weight averages 0.2 to 0.3 ounces (5 to 8 grams), with females tending to be slightly larger than males. The NLEB’s fur color can be medium to dark brown on the back and tawny to pale-brown on the underside (**Figure 1**). As its name suggests, this bat is distinguished by its long ears, particularly as compared to other bats in the *Myotis* genus. In Wisconsin, the NLEB may be mistaken for the Little Brown Bat or the Indiana Bat (WDNR, 2017).

The NLEB has a diverse diet, including moths, flies, leafhoppers, caddisflies, beetles, and arachnids. These bats forage for insects in upland and lowland woodlots and tree-lined corridors. NLEBs are nocturnal and emerge at dusk to feed during their active time. They primarily fly through the understory of forested areas feeding on prey, which they catch while in flight using echolocation or by gleaning motionless insects from vegetation and water surfaces.

Breeding begins in late summer or early fall when males begin swarming near hibernacula. After copulation, females store sperm during hibernation until spring, when they emerge from their hibernacula, ovulate, and the stored sperm fertilizes an egg. After fertilization, pregnant females migrate to summer areas where they roost in small colonies and give birth to a single pup. Maternity colonies, with young, generally have 30 to 60 bats, although larger maternity colonies have also been observed. Most females within a maternity colony give birth around the same time, which may occur between May and July in Wisconsin (WDNR, 2020). Young bats start flying by 18 to 21 days after birth.



Figure 1. NLEB (Dave Redell, WDNR)

Northern Long-eared Bat Suitable Habitat

NLEBs spend winter hibernating in caves, abandoned mines, or similar structures, preferring areas with constant temperatures, high humidity, and no air currents. They enter winter hibernacula from late August through September (MNDNR, 2018). Within these hibernacula, they use small crevices or cracks, often with only the nose and ears visible (**Figure 2**). NLEBs emerge from hibernation in April and May (WDNR, 2017).

During the summer and portions of the fall and spring, NLEBs may be found roosting singly or in colonies underneath bark, in cavities or in crevices (**Figure 3**) of both live trees and snags, or dead trees (typically ≥ 3 inches (7.6 cm) diameter at breast height). Males and non-reproductive females may also roost in cooler places, like caves and mines. NLEBs seem to be flexible in selecting roosts and choosing roost trees based on suitability to retain bark or provide cavities or crevices. The species has also been found, although less commonly, roosting in manmade structures, such as barns and sheds. NLEBs use forested areas not only for roosting but also for foraging and commuting between summer and winter habitat. NLEBs often use edge habitats for migrating and foraging (WDNR, 2017).



Figure 2. NLEB hibernacula in southwestern WI (Heather Kaarakka, WDNR)



Figure 3. NLEB in a crevice in Pierce County, WI (Heather Kaarakka, WDNR)

The NLEB has been documented in many counties in Minnesota and Wisconsin and is believed to range throughout both states. The species is present year-round, migrating between summer and winter habitat during the spring and fall. Many NLEB hibernacula have been documented in Minnesota and Wisconsin, most of which are abandoned mines.

Northern Long-eared Bat Critical Habitat

In 2016, the USFWS determined that designation of CH for NLEB was not prudent (USFWS, 2016a). The USFWS determined that designating the wintering habitat as CH for the bat would likely increase the threat from vandalism and disturbance, and could, potentially, increase the spread of white-nose syndrome. In addition, designating the summer habitat as CH would not be beneficial to the species because there are no areas within the summer habitat that meet the definition of CH.

Northern Long-eared Bat References

- MNDNR. (2018). *Myotis septentrionalis* (Trovessart, 1897). Retrieved from <https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=AMACC01150>
- USFWS. (2015, April 2). *Endangered and Threatened Wildlife and Plants; Endangered and Threatened Wildlife and Plants; Threatened Species Status for the Northern Long-Eared Bat With 4(d) Rule*. Retrieved from US Federal Register: <https://www.govinfo.gov/content/pkg/FR-2015-04-02/pdf/2015-07069.pdf>
- USFWS. (2016a, April 27). *Endangered and Threatened Wildlife and Plants: Revised Designation that Critical Habitat is not Prudent for the Northern Long-Eared Bat*. Retrieved from US Federal Register: <https://www.govinfo.gov/content/pkg/FR-2016-04-27/pdf/2016-09673.pdf#page=1>
- USFWS. (2016b, January 14). *Endangered and Threatened Wildlife and Plants; 4(d) Rule for the Northern Long-Eared Bat*. Retrieved from US Federal Register: <https://www.govinfo.gov/content/pkg/FR-2016-01-14/pdf/2016-00617.pdf#page=1>
- USFWS. (2022a, March 22). *Species Status Assessment for the Northern long-eared bat (Myotis septentrionalis) Version 1.1*. Retrieved from USFWS ECOS: <https://ecos.fws.gov/ServCat/DownloadFile/215290>
- USFWS. (2022b). <https://www.govinfo.gov/content/pkg/FR-2015-04-02/pdf/2015-07069.pdf>. Retrieved from US Ecosphere: <https://www.fws.gov/species/northern-long-eared-bat-myotis-septentrionalis>
- WDNR. (2017, June 23). *Northern Long-Eared Bat (Myotis septentrionalis) Species Guidance*. Madison, WI: Wisconsin Department of Natural Resources Bureau of Natural Heritage Conservation. Retrieved from <https://dnr.wi.gov/files/PDF/pubs/er/ER0700.pdf>
- WDNR. (2020, October 8). Retrieved from Northern Long-eared Bat (*Myotis septentrionalis*): <https://dnr.wi.gov/topic/EndangeredResources/Animals.asp?mode=detail&SpecCode=AMACCO1150>

Appendix 16 – Piping Plover (*Charadrius melodus*)

Piping Plover Species Summary

The Piping Plover is currently listed by the U.S. Fish and Wildlife Service (USFWS) under the Endangered Species Act (ESA) as ‘endangered’ in the Great Lakes watershed (USFWS, 1985), which includes Minnesota and Wisconsin. Threats to this species include the loss and degradation of habitat due to development, disturbance by humans and pets, disease, predation, and unpredictable changes in the environment. The USFWS species profile for the Piping Plover can be found at <https://ecos.fws.gov/ecp/species/6039>. Additional information can be found at <https://www.fws.gov/species/piping-plover-charadrius-melodus>. A summary of the ecology of this species can be found in the USFWS Piping Plover recovery plan (USFWS, 2003) and 5-year review (USFWS, 2020). Critical habitat (CH) was designated for the Great Lakes breeding population of Piping Plover in 2001 (USFWS, 2001).

Piping Plover Biological Information

The Piping Plover is a white-breasted, pale-backed, sandy-gray shorebird with a stubby, short bill. It is about the size of a sparrow. Piping Plover size ranges from 6.8 to 7 inches (in) (17.1 to 17.8 cm) in length, with a wingspan of 18 to 18.8 in (46 to 48 cm) and a mass of 1.5 to 1.7 ounces (43 to 48 grams). It is named for its clear, melodious “peep-peep-peep-lo” call.

Plumage differs between the summer breeding season and the winter non-breeding season. During the breeding season, the adult has yellow-orange legs, a black band across the forehead (eye to eye in males and just short of the eyes in females), and a dark band around the neck (a bolder, thicker neckband in males and a lighter, narrower neck band in females). Bill color is orange at the base and black-tipped (**Figure 1**). During migration and winter, the Piping Plover has a more faded color overall, although the leg color remains bright yellow to orange. Additional winter plumage differences include the bill color, which is usually all black (no orange base or just a hint of orange); the dark head band, which disappears; and the dark neck ring, which thins and fades to grey (**Figure 2**).

Piping Plovers are diurnal and forage on exposed beach surfaces. They eat insects, marine worms, crustaceans, mollusks, and eggs and larvae of flies and beetles that are 0.5 in (1.3 cm) or less below the surface.



Figure 1. A Piping Plover in breeding coloration has a black forehead band, complete black neck band, orange and black bill; the legs may be yellow or orange (Bob Gress)



Figure 2. A Piping Plover in winter coloration has a nearly all-black bill, no forehead band, and incomplete faded grey neck band; legs may be yellow or orange (Arthur Morris)

Piping Plover Suitable Habitat

Piping Plovers have 3 disparate breeding populations: The Great Lakes, the Northern Great Plains, and the Atlantic Coast. Individuals from all 3 breeding populations winter along the Atlantic and Gulf coastal areas from North Carolina to Texas. They roost in unvegetated or sparsely vegetated areas, which may have

debris, detritus, or micro-topographic relief that provide the Piping Plovers with refuge from high winds and cold weather.

In the Great Lakes region, Piping Plovers nest, feed, and rear their young in open, sparsely vegetated sandy areas. These areas include sand spits and sand beaches with wide, unforested dunes and swales or in the flat pans behind the primary dune (**Figure 3**). Piping plover nests are scraped-out depressions in sandy soil, and they may be lined with pebbles. Spacing between piping plover nests varies, but generally a pair will defend a small territory of about 656 feet (ft) (200 meters [m]). Females lay an average of 4 eggs.

Piping plovers begin arriving in Minnesota and Wisconsin in mid-April to early May, and most mated pairs are nesting by mid to late May and early June. Eggs typically hatch from early June to mid- July, with chicks fledging 21 to 30 days after hatching. Although piping plovers typically produce one brood per year, they sometimes have two broods during a summer. Most adults depart for their wintering grounds by mid-August. Young birds hatched during the summer start their migration a few weeks later than adults, and most are gone from the Great Lakes by late August.



Figure 3. Piping Plover suitable habitat, Sturgeon Bay, MI (Andrea Rinne)

Piping Plover Critical Habitat

Critical habitat was designated for the Great Lakes breeding population in 2001 (USFWS, 2001). The biological and physical features (formerly Primary Constituent Elements) required to sustain the Great Lakes breeding population of the Piping Plover are found on Great Lakes islands and mainland shorelines

that support open, sparsely vegetated sandy habitats, such as sand spits or sand beaches, that are associated with wide, unforested dunes and inter-dune wetlands.

In order for nesting habitat to be physically and biologically suitable for Piping Plovers, it must have a total shoreline length of at least 0.12 miles (mi) (0.2 kilometers [km]) of gently sloping, sparsely vegetated (less than 50 percent herbaceous and low woody cover) sand beach with a total beach area of at least 5 acres (ac) (2 hectares [ha]). Appropriately sized sites must also have areas of at least 164 ft (50 m) in length where (1) the beach width is more than 23 ft (7 m), (2) there is protective cover for nests and chicks, and (3) the distance to the treeline (from the normal high-water line to where the forest begins) is more than 164 ft (50 m). Beach width is defined as the distance from the normal high-water line to the foredune (a low barrier dune ridge immediately inland from the beach) edge, or to the sand/vegetation boundary in areas where the foredune is absent. The beach width may be narrower than 23 ft (7 m) if appropriate sand and cobble areas of at least 23 ft (7 m) exist between the dune and the treeline. Protective cover for nests and chicks consists of small patches of herbaceous vegetation, cobble (stones larger than 0.4 in (1 cm) diameter), gravel (stones smaller than 0.4 in (1 cm) diameter), or debris such as driftwood, wrack, root masses, or dead shrubs. These areas must have a low level of disturbance from human activities and from domestic animals. As the nesting season progresses, the level of disturbance tolerated by piping plovers increases. A lower level of disturbance is required at the beginning of the nesting period during nest site selection, egg laying, and incubation. Beach activities that may be associated with a high level of disturbance include, but are not limited to, walking pets off leash, loud noise, driving all-terrain vehicles (ATVs), or activities that significantly increase the level of people using the beach. The level of disturbance is relative to the proximity to the nest, intensity, and frequency of these and other similar activities. The dynamic ecological processes that create and maintain piping plover habitat are also important primary constituent elements. These geologically dynamic lakeside regions are controlled by processes of erosion, accretion, plant succession, and lake-level fluctuations. The integrity of the habitat depends upon regular sediment transport processes, as well as episodic, high magnitude storm events. By their nature, Great Lakes shorelines are in a constant state of change; habitat features may disappear or be created nearby. The critical habitat boundaries reflect these natural processes and the dynamic character of Great Lakes shorelines.

In Minnesota, CH has been designated for the northern Great Plains breeding population in Lake of the Woods County and for the Great Lakes breeding population in St. Louis County. In Wisconsin, Douglas, Ashland, Marinette and Manitowoc Counties have CH units for the Great Lakes breeding population.

Piping Plover Determination Key Guidance

The proposed action is the compilation of many different types of projects that, depending on their size and specific location, often do not significantly affect any federally listed threatened or endangered species or critical habitats in Minnesota and Wisconsin. Common project types include, but are not limited to, the following:

- Vegetation management, including mowing, forestry activities, prescribed burning, and harvest
- Construction, maintenance, operation, and/or removal of:
 - Roads/trails
 - Communication towers
 - Transmission/utility lines

- Bridges/culverts
- Oil/gas pipelines
- Solar power facilities
- Hydroelectric facilities/ dams
- Mines/quarries
- Canals/levees/dikes
- Commercial/residential/recreational developments
- Agricultural activities
- Site/habitat restoration/enhancement
- Shoreline protection/beach nourishment
- Dredging and filling of wetlands/waterbodies
- Military operations

No Effect

Projects that intersect the Piping Plover species list area may result in a No Effect (NE)¹ determination if:

1. The action does NOT intersect the Piping Plover buffer zone²
2. The action intersects the Piping Plover buffer zone² AND all of the following apply:
 - does NOT occur in suitable habitat³
 - occurs outside of the Piping Plover migration season⁴
3. The action area occurs within CH but does NOT contain any physical or biological features⁵ essential to the conservation of the Piping Plover.

Not Likely to Adversely Affect

Projects that intersect the Piping Plover species list area may result in a Not Likely to Adversely Affect (NLAA)⁶ determination if:

1. The action intersects the Piping Plover buffer zone² AND all of the following apply:
 - does NOT occur in suitable habitat³
 - occurs during the migration season.⁴
2. The action intersects the Piping Plover buffer zone² AND all of the following apply:
 - occurs in suitable habitat³
 - results in changes to Piping Plover habitat quality, quantity, or availability⁷ that are NOT permanent⁸
 - will NOT overlap with the breeding season⁹
 - changes will NOT result in increased disturbance activity.¹⁰
3. The action area occurs within CH, contains physical or biological features⁵ essential to the conservation of the Piping Plover AND all of the following apply:
 - does NOT result in changes to Piping Plover habitat quality, quantity, or availability⁷
 - does NOT result in increased disturbance activity.¹⁰

May Affect

Projects that intersect Piping Plover species list area may result in a May Affect (MA)¹¹ determination if:

1. The action intersects the Piping Plover buffer zone² AND occurs in suitable habitat³ AND all of the following apply:
 - will result in changes to Piping Plover habitat quality, quantity, or availability⁷
 - will overlap with the breeding season.⁹
2. The action intersects the Piping Plover buffer² zone AND occurs in suitable habitat³ AND all of the following apply:

- will NOT overlap with the breeding season⁹
 - will result in permanent⁸ changes to Piping Plover habitat quality, quantity, or availability.⁷
3. The action intersects the Piping Plover buffer² zone AND occurs in suitable habitat³ AND all of the following apply:
- will NOT overlap with the breeding season⁹
 - will NOT result in permanent⁸ changes to Piping Plover habitat quality, quantity, or availability⁷
 - will result in increased disturbance activity.¹⁰
4. The action area occurs within CH, contains physical or biological features⁵ essential to the conservation of the Piping Plover AND the following applies:
- the action results in changes to Piping Plover habitat quality, quantity, or availability⁷
- OR
- the action results in permanent⁸ changes to suitable piping plover habitat³
- OR
- the action results in increased disturbance activity.¹⁰

Piping Plover References

- USFWS. (1985, December 11). *Endangered and Threatened Wildlife and Plants; Determination of Endangered and Threatened Status for the Piping Plover*. Retrieved from US Federal Register: https://ecos.fws.gov/docs/federal_register/fr1062.pdf
- USFWS. (2001, May 7). *Endangered and Threatened Wildlife and Plants; Final Determination of Critical Habitat for the Great Lakes Breeding Population of the Piping Plover*. Retrieved from US Federal Register: <https://www.govinfo.gov/content/pkg/FR-2001-05-07/pdf/01-11205.pdf#page=1>
- USFWS. (2003, September 8). *Recovery Plan for the Great Lakes Piping Plover (Charadrius melodus)*. Retrieved from USFWS ECOS: https://ecos.fws.gov/docs/recovery_plan/030916a.pdf
- USFWS. (2018, August 17). *Shorebirds Effects Determination Guidance for Endangered & Threatened Species (EDGES)*. Retrieved from USFWS Ecosphere: <https://www.fws.gov/sites/default/files/documents/2018-0817-EDGES-Knot-Plover.pdf>
- USFWS. (2020, March 26). *Piping Plover (Charadrius melodus) 5-Year Review: Summary and Evaluation*. Retrieved from USFWS ECOS: https://ecos.fws.gov/docs/tess/species_nonpublish/3383.pdf

¹No effect – The proposed project would result in no effect to this species and/or its federally designated critical habitat (if applicable). Further consultation with the USFWS Minnesota Wisconsin Ecological Services Field Office is not necessary for the project as described.

²0.25 miles (354 m) from a Great Lakes shoreline.

³Piping Plover suitable habitat consists of Great Lakes islands and mainland shorelines that support, or have the potential to support, open, sparsely vegetated sandy habitats, such as sand spits or sand beaches, that are associated with wide, unforested systems of dunes and inter-dune wetlands.

⁴April 1 through June 15 in the spring OR August 15 through September 15 in the fall.

⁵In order for habitat to be physically and biologically suitable for Piping Plovers, it must have a total shoreline length of at least 0.12 miles (mi) (0.2 kilometers [km]) of gently sloping, sparsely vegetated (less than 50 percent herbaceous and low woody cover) sand beach with a total beach area of at least 5 acres (ac) (2 hectares [ha]). Appropriately sized sites must also have areas of at least 164 ft (50 m) in length where (1) the beach width is more than 23 ft (7 m), (2) there is protective cover for nests and chicks, and (3) the distance to the treeline (from the normal high water line to where the forest begins) is more than 164 ft (50 m). Beach width is defined as the distance from the normal high-water line to the foredune (a low barrier dune ridge immediately inland from the beach) edge, or to the sand/vegetation boundary in areas where the foredune is absent. The beach width may be narrower than 23 ft (7 m) if appropriate sand and cobble areas of at least 23 ft (7 m) exist between the dune and the treeline. Protective cover for nests and chicks consists of small patches of herbaceous vegetation, cobble (stones larger than 0.4 in (1 cm) diameter), gravel (stones smaller than 0.4 in (1 cm) diameter), or debris such as driftwood, wrack, root masses, or dead shrubs. These areas must have a low level of disturbance from human activities and from domestic animals. As the nesting season progresses, the level of disturbance tolerated by piping plovers increases. A lower level of disturbance is required at the beginning of the nesting period during nest site selection, egg laying, and incubation. Beach activities that may be associated with a high level of disturbance include, but are not limited to, walking pets off leash, loud noise, driving all-terrain vehicles (ATVs), or activities that significantly increase the level of people using the beach. The level of disturbance is relative to the proximity to the nest, intensity, and frequency of these and other similar activities. The dynamic ecological processes that create and maintain piping plover habitat are also important primary constituent elements. These geologically dynamic lakeside regions are controlled by processes of erosion, accretion, plant succession, and lake-level fluctuations. The integrity of the habitat depends upon regular sediment transport processes, as well as episodic, high magnitude storm events. By their nature, Great Lakes shorelines are in a constant state of change; habitat features may disappear or be created nearby. The critical habitat boundaries reflect these natural processes and the dynamic character of Great Lakes shorelines.

⁶NLAA – For projects that reach a “not likely to adversely affect” determination, there is a 30 day “verification period” to allow the USFWS to review the project details and ensure the action meets the criteria for a NLAA determination. Output letters will indicate that if the project proponent does not hear otherwise within that timeframe, the NLAA determination is verified and they can proceed with their action as described in the IPaC report and concurrence verification letter. This verification period allows the USFWS Minnesota Wisconsin Ecological Services Field Office to apply local knowledge to evaluation of the action and ensure actions do not have unanticipated impacts. Thus, there may be a small subset of actions for which the USFWS Minnesota Wisconsin Ecological Services Field Office may request additional information during this timeframe to verify the effects determination reached through the IPaC DKey.

⁷For example, beach grooming, boardwalk actions, breakwaters, development, dredge deposition, etc.

⁸In this context, we define permanent to be effects lasting in duration more than 3 weeks.

⁹April 15 through August 15.

¹⁰For example, human disturbance, domesticated animal activity, or increased potential predators such as merlins, mammalian predators, ect.

¹¹May affect – Further consultation with the USFWS Minnesota Wisconsin Ecological Services Field Office is necessary in order to discern if the activity would result in a “no effect”, “not likely to adversely affect”, or “likely to adversely affect” determination.

Appendix 17 – Pitcher’s Thistle (*Cirsium pitcheri*)

Pitcher’s Thistle Species Summary

Pitcher’s Thistle is currently listed by the U.S. Fish and Wildlife Service (USFWS) under the Endangered Species Act (ESA) as ‘threatened’ across its range (USFWS, 1988). Threats to Pitcher’s Thistle are shoreline development, dune stabilization, recreation, and invasive non-native plants and animals (USFWS, 2002) including seed-eating weevils (USFWS, 2018). The USFWS species profile for Pitcher’s Thistle can be found at <https://ecos.fws.gov/ecp/species/8153>. Additional information can be found at <https://www.fws.gov/species/sand-dune-thistle-cirsium-pitcheri>. A summary of the ecology of this species can be found in the USFWS Pitcher’s Thistle recovery plan (USFWS, 2002) and most recent 5-year review (USFWS, 2018). No critical habitat has been designated for this species.

Pitcher’s Thistle Biological Information

Pitcher’s Thistle is a native thistle and grows for 5 to 8 years before it flowers. Its non-flowering form is a rosette or cluster of silvery leaves and its flowering form typically has one stem with many branches (**Figure 1**). The entire flowering plant may grow 3 feet (0.9 meters (m)) tall. Cream or pink flowers grow at the end of branches and from the leaf axils. Leaves are deeply lobed and may be 1 foot (0.3 m) long. Each lobe may be up to 3.1 inches (8 centimeters (cm)) long and 0.3 inches (0.8 cm) wide and tipped by a weak spine, long and linear. The stems and leaves of both the flowering and non-flowering forms are covered with white hairs that give the plant a woolly white or silvery appearance. These hairs are an adaptation to its beach environment and help the plant retain water and reflect the sun’s strong rays. Spines are found along the edges of leaves near the base and at the tips of some of the lobes. Both non-flowering and flowering plants have a long taproot, up to 6 feet (1.8 m) long.

Pitcher’s Thistle blooms and sets seed once during its lifetime, after a 5 to 8 years (i.e., juvenile) non-flowering period. It then blooms from late June to late July with several white to pale pink flower heads (WDNR, 2021). Phyllaries are 0.8 to 1.2 inches (2 to 3 cm) long and tipped by weak spines. Thirty species of insects, mainly bees, have been observed pollinating Pitcher’s Thistle blossoms. After the seeds mature, they fall or are windblown and germinate the following spring and early summer. The fruit is a sunflower-like seed pod between 0.2 and 0.3 inches (5 and 7.5 millimeters) in length and fruiting occurs in late June through late July (WDNR, 2021). The optimal identification period is late June through late August (WDNR, 2021).



Figure 1. *Pitcher's Thistle* (Cathy Pollack, USFWS)

Pitcher's Thistle Suitable Habitat

Pitcher's Thistle is found on the sparsely vegetated or open sand dunes and low open beach ridges of Great Lakes shorelines (**Figure 2**). The species requires active sand dune processes to maintain its early successional habitat (USFWS, 2002). It is most often found in near-shore plant communities, but it can grow in all non-forested areas of a sand dune system. Pitcher's Thistle requires full sunlight for maximum growth and survival (USFWS, 2010), and tends to colonize open areas or areas with low plant cover (WDNR, 2021).

At the time of the Pitcher's Thistle recovery plan (USFWS, 2002), Pitcher's Thistle was known from 9 isolated sites in Wisconsin, of which 6 are from Door County. Three Wisconsin sites are in state parks and another 4 are located on private properties enrolled in the WDNR landowner program. A reintroduced population is located at the Kenosha Dunes State Natural Area.

Pitcher's Thistle is found in Door, Manitowoc, and Sheboygan counties.



Figure 2. *Pitcher's Thistle* suitable habitat (Darcy Kind, WDNR)

Pitcher's Thistle Critical Habitat

Critical habitat has not been designated for Pitcher's Thistle.

Pitcher's Thistle Determination Key Guidance

The proposed action is the compilation of many different types of projects that, depending on their size and specific location, often do not significantly affect any Federally listed threatened or endangered species or critical habitats in Minnesota and Wisconsin. Common project types include, but are not limited to, the following:

- Vegetation management, including mowing, forestry activities, prescribed burning, and harvest
- Construction, maintenance, operation, and/or removal of:
 - Roads/trails
 - Communication towers
 - Transmission/utility lines
 - Bridges/culverts
 - Oil/gas pipelines
 - Solar power facilities

- Hydroelectric facilities/ dams
- Mines/quarries
- Canals/levees/dikes
- Commercial/residential/recreational developments
- Agricultural activities
- Site/habitat restoration/enhancement
- Shoreline protection/beach nourishment
- Dredging and filling of wetlands/waterbodies
- Military operations

No Effect

Projects that intersect the Pitcher's Thistle species list area may result in a No Effect (NE)¹ determination if both of the following apply:

- A survey was completed, and the Pitcher's Thistle was not detected.
 - Upload the survey results to IPaC. If unable to upload the survey to IPaC, email the survey results to the MNWI ES Field Office (TwinCities@fws.gov).
- The action area occurs in unsuitable habitat.

Not Likely to Adversely Affect

Projects that intersect Pitcher's Thistle species list area may result in a Not Likely to Adversely Affect (NLAA)² determination if:

- There are restrictions on stream/hydrology-impacting or vegetation/ground-disturbing activities within the species list area/buffered habitat. Restrictions include actions that are likely to change the elevations of surface water upstream or downstream, or in the local groundwater (as estimated pre-action vs. post-action); as well as the potential to impact the riparian zone (up to 200 feet) or indirectly impact a stream or river (e.g., cut and fill, horizontal directional drilling, construction, vegetation removal, pesticide or fertilizer application, discharge, runoff of sediment or pollutants, increase in erosion).
- Restrictions on actions that may fragment habitat or create barriers to movement/dispersal within the species list area.

May Affect

Projects that intersect Pitcher's Thistle species list area and have either determined presence through a survey or have not conducted a survey will result in a May Affect (MA)³ determination if any of the following occurs:

- Suitable habitat is present
- Suitable habitat is present in the surrounding area
- There are known elemental occurrences⁴ in the action area/surrounding area
- There is evidence of habitat fragmentation in the action area/surrounding area
- The action occurs during flowering season
- Wetland delineation or habitat assessment/survey suggest presence of the species
- The species is observed during a site visit or there are reports of presence
- Disturbance of the ground or existing vegetation⁵
- Indirect alteration of the habitat or resources of the listed plant(s)⁶
- Direct harm to the listed plant(s)⁷

Pitcher's Thistle References

- USFWS. (1988, July 18). *Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for *Cirsium Pitcheri**. Retrieved from US Federal Register:
<https://www.govinfo.gov/content/pkg/FR-1988-07-18/pdf/FR-1988-07-18.pdf#page=159>
- USFWS. (2002, September 20). *Pitcher's Thistle (*Cirsium pitcheri*) Recovery Plan*. Retrieved from USFWS ECOS: https://ecos.fws.gov/docs/recovery_plan/020920b.pdf
- USFWS. (2010, February 5). *Pitcher's Thistle (*Cirsium pitcheri*) 5-Year Review: Summary and Evaluation*. Retrieved from USFWS ECOS: https://ecos.fws.gov/docs/tess/species_nonpublish/1529.pdf
- USFWS. (2018, September 26). *Pitcher's Thistle (*Cirsium pitcheri*) 5-Year Review: Summary and Evaluation*. Retrieved from USFWS ECOS:
https://ecos.fws.gov/docs/tess/species_nonpublish/2673.pdf
- WDNR. (2021, May 5). Retrieved from Pitcher's Thistle (*Cirsium pitcheri*):
<https://dnr.wi.gov/topic/EndangeredResources/Plants.asp?mode=detail&SpecCode=PDAST2E2A0>

¹No effect – The proposed project would result in no effect to this species and/or its federally designated critical habitat (if applicable). Further consultation with the USFWS Minnesota Wisconsin Ecological Services Field Office is not necessary for the project as described.

²NLAA – For projects that reach a “not likely to adversely affect” determination, there is a 30 day “verification period” to allow the USFWS to review the project details and ensure the action meets the criteria for a NLAA determination. Output letters will indicate that if the project proponent does not hear otherwise within that timeframe, the NLAA determination is verified and they can proceed with their action as described in the IPaC report and concurrence verification letter. This verification period allows the USFWS Minnesota Wisconsin Ecological Services Field Office to apply local knowledge to evaluation of the action and ensure actions do not have unanticipated impacts. Thus, there may be a small subset of actions for which the USFWS Minnesota Wisconsin Ecological Services Field Office may request additional information during this timeframe to verify the effects determination reached through the IPaC Dkey.

³May affect – Further consultation with the USFWS Minnesota Wisconsin Ecological Services Field Office is necessary in order to discern if the activity would result in a “no effect”, “not likely to adversely affect”, or “likely to adversely affect” determination.

⁴Elemental occurrence data can be accessed from the Wisconsin Natural Heritage Inventory: <https://dnr.wisconsin.gov/topic/NHI> and the Minnesota Department of Natural Resources Natural Heritage Information System: <https://www.dnr.state.mn.us/nhnrp/nhis.html>

⁵This includes any off-road vehicle access, soil compaction, digging, seismic survey, directional drilling, heavy equipment, grading, trenching, placement of fill, pesticide application (herbicide, fungicide), vegetation management (including removal or maintenance using equipment or chemicals), cultivation, development, etc.

⁶For example, actions that cause a change in canopy cover, microclimate, humidity, increase in invasive species, hydrologic alterations, etc.

⁷For example, through mowing/haying, prescribed fire, herbicide application, trampling, increased herbivory, cutting/clearing, cultivation, crushing by vehicle, reduction to possession, etc.

Appendix 18 – Poweshiek Skipperling (*Oarisma poweshiek*)

Poweshiek Skipperling Species Summary

The Poweshiek Skipperling is currently listed by the U.S. Fish and Wildlife Service (USFWS) under the Endangered Species Act (ESA) as ‘endangered’ across its range (USFWS, 2014). It is not known exactly what led to the precipitous decline in the species, however, populations are likely influenced by degradation and destruction of habitat through conversion of native prairie to cropland or development; ecological succession to woody vegetation; encroachment of invasive species; past and present fire, haying, or grazing management that degrades or destroys the species’ habitats; flooding; and, groundwater depletion, alteration, and contamination. Additionally, biocide use, including herbicides, insecticides, fungicides, and their associated additives, may have direct or indirect effects on Poweshiek Skipperlings, compounding the effects of habitat curtailment. Small and isolated populations also increase vulnerability (USFWS, 2021). The USFWS species profile for the Poweshiek Skipperling can be found at <https://ecos.fws.gov/ecp/species/9161>. Additional information can be found at <https://fws.gov/species/poweshiek-skipperling-oarisma-poweshiek>. A summary of the ecology of this species can be found in the USFWS Poweshiek Skipperling draft recovery plan (USFWS, 2021) and the most recent 5-year review (USFWS, 2019). Critical habitat was designated for the Poweshiek Skipperling in 2015 (USFWS, 2015).

Poweshiek Skipperling Biological Information

Poweshiek Skipperlings are small and slender-bodied butterflies, with a wingspan ranging from approximately 0.9 to 1.2 inches (2.3 to 3.0 centimeters). Antennae are short and relatively stout and have blunt-tipped clubs. Wings are triangular and sharply pointed at the tips (WDNR, 2020). Although capable of rapid flight, this skipper more typically flies erratically just above the grasses at a speed that is relatively easy to follow with the eye (MNDNR, 2022).

The upper wing surface is dark brown with a band of orange along the leading edge of the forewing. The lower surface is also dark brown, but the veins of all but the anal third of the hindwing are outlined in hoary, giving an overall white appearance to the undersurface (**Figures 1 and 2**).

Poweshiek Skipperling eggs are pale yellowish green, mushroom shaped with a flattened bottom, a slightly depressed micropyle, and smooth surfaced. The head and body of the larvae is pale grass-green, with a distinctive darker green middorsal stripe and seven cream-colored stripes on each side (USFWS, 2022).



Figure 1. Reared Poweshiek Skipperling (Erik Runquist, Minnesota Zoo)



Figure 2. Female Poweshiek Skipperling (Tamara Smith, USFWS)

Poweshiek Skipperling Suitable Habitat

Poweshiek Skipperling habitat includes remnant prairie areas including prairie fens, grassy lake and stream margins, moist meadows, sedge meadows, and wet-to-dry prairies (**Figure 3**). The species relies on remaining remnant (unplowed) native prairies and has not been found in reconstructed prairies (USFWS, 2022). High-quality habitat conditions for this species require natural or human disturbances that maintain the integrity of these plant communities, while minimizing mortality to vulnerable life stages.

Poweshiek Skipperlings have an estimated maximum dispersal distance of 0.6 miles (1 kilometer) and a single annual flight (USFWS, 2022). The flight period runs from mid-June through July, typically peaking in the first two weeks of July (WDNR, 2020). During the short time adults are alive (2-4 weeks), they need sufficient high-quality nectar from flowers for feeding and healthy and abundant suitable grasses (host plants) for oviposition (laying eggs).

In Wisconsin, plants from the sunflower and cordgrass family are important. Favorite nectar sources are Pale Purple Coneflower, Black-eyed Susan, Coneflower, Joe Pyeweed, Marsh Milkweed, Gayfeather, and Big Bluestem (WDNR, 2020).

Poweshiek Skipperlings bask with wings spread and may be found resting on Prairie Dock or sedges. Eggs are laid near the tips of grass blades. Eggs and larvae remain on the host plants from late June through the winter until pupation in late May. Larvae feed until they enter diapause in late autumn (based on temperature) and overwinter on the host plant. Feeding resumes around the end of March. Larvae need suitable microhabitat (temperature and humidity) and sufficient host grasses to feed on throughout the summer. Larvae are reported to feed primarily on Prairie Dropseed and Little Bluestem (WDNR, 2020). The species overwinters as larvae above ground on the blades or stem of the host plant; thus requiring habitat that provides suitable microclimate for shelter during winter (USFWS, 2021).



Figure 3. Poweshiek Skipperling prairie habitat, Wisconsin (Tamara Smith, USFWS)

At the time of listing in Wisconsin there were 3 sites with unknown occupancy and 1 site where Poweshiek Skipperling (Puchyan Prairie) were present. The 3 sites with previously unknown occupancy are now all considered extirpated while Puchyan Prairie is still host to Poweshiek Skipperling. Annually, since 2012, no more than 3 Poweshiek Skipperlings have been observed at Puchyan Prairie. In both 2017 and 2018, there was 1 individual sighted, however with a lack of photo documentation, these sightings cannot be confirmed.

Poweshiek Skipperling was once widespread and abundant in Minnesota; however there have been no confirmed sightings of the species in the state since 2007 (USFWS 2019, unpub. data) (MNDNR, 2022). One unconfirmed sighting in 2013 occurred at a prairie complex owned and managed primarily by the Minnesota Department of Natural Resources (MNDNR) in the Chicog Wildlife Management Area (WMA). This area has also had recent adult observations over multiple years (2004 to 2007, and unconfirmed in 2013). Follow-up surveys in 2014 and 2016 resulted in no detections of the species at Chicog WMA (MNDNR 2017, unpub. data) (USFWS, 2019).

Poweshiek Skipperling Critical Habitat

Critical habitat was designated for the Poweshiek Skipperling in 2015 (USFWS, 2015) and consists of 4 biological and physical features (Primary Constituent Elements):

(1) Wet-mesic to dry tallgrass remnant untilled prairies or remnant moist meadows containing (a) a predominance of native grasses and native flowering forbs; (b) undisturbed (untilled) glacial soil types including, but not limited to, loam, sandy loam, loamy sand, gravel, organic soils (peat), or marl that provide the edaphic features conducive to Poweshiek Skipperling larval survival and native prairie vegetation; (c) if present, depressional wetlands or low wet areas, within or adjacent to prairies that provide shelter from high summer temperatures and fire; (d) if present, trees or large shrub cover less than 5 percent of area in dry prairies and less than 25 percent in wet mesic prairies and prairie fens; and species occurring in less than 5 percent of the area.

(2) Prairie fen habitats containing (a) a predominance of native grasses and native flowering forbs; (b) undisturbed (untilled) glacial soil types including, but not limited to, organic soils (peat), or marl that provide the edaphic features conducive to Poweshiek Skipperling larval survival and native prairie vegetation; (c) depressional wetlands or low wet areas, within or adjacent to prairies that provide shelter from high summer temperatures and fire; (d) hydraulic features necessary to maintain prairie fen groundwater flow and prairie fen plant communities; (e) if present, trees or large shrub cover less than 25 percent of the unit; and (f) if present, nonnative invasive plant species occurring in less than 5 percent of area.

(3) Native grasses and native flowering forbs for larval and adult food and shelter, specifically; (a) at least one of the following native grasses available to provide larval food and shelter sources during Poweshiek Skipperling larval stages: Prairie Dropseed, Little Bluestem, Sideoats Grama, or Mat Muhly; and (b) at least one of the following forbs in bloom to provide nectar and water sources during the Poweshiek Skipperling flight period: Purple Coneflower, Black-eyed Susan, Smooth Ox-eye, Stiff Tickseed, Palespike Lobelia, Sticky Tofieldia, or Shrubby Cinquefoil.

(4) Dispersal grassland habitat that is within 1 km (0.6 mi) of native high-quality remnant prairie (as defined in Primary Constituent Element 1) that connects high quality wet-mesic to dry tallgrass prairies, moist meadows, or prairie fen habitats. Dispersal grassland habitat consists of the following physical characteristics appropriate for supporting Poweshiek Skipperling dispersal: undeveloped open areas dominated by perennial grassland with limited or no barriers to dispersal including tree or shrub cover less than 25 percent of the area and no row crops such as corn, beans, potatoes, or sunflowers.

Poweshiek Skipperling Determination Key Guidance

The proposed action is the compilation of many different types of projects that, depending on their size and specific location, often do not significantly affect any federally listed threatened or endangered species or critical habitats in Minnesota and Wisconsin. Common project types include, but are not limited to, the following:

- Vegetation management, including mowing, forestry activities, prescribed burning, and harvest
- Construction, maintenance, operation, and/or removal of:
 - Roads/trails
 - Communication towers
 - Transmission/utility lines
 - Bridges/culverts
 - Oil/gas pipelines
 - Solar power facilities
 - Hydroelectric facilities/ dams
 - Mines/quarries
 - Canals/levees/dikes
- Commercial/residential/recreational developments
- Agricultural activities
- Site/habitat restoration/enhancement
- Shoreline protection/beach nourishment
- Dredging and filling of wetlands/waterbodies

- Military operations

No Effect

Projects that are outside of the Poweshiek Skipperling species list area OR outside of Poweshiek Skipperling suitable habitat¹ will result in a No Effect (NE)² determination.

Not Likely to Adversely Affect

Projects that intersect Poweshiek Skipperling species list area may result in a Not Likely to Adversely Affect (NLAA)³ determination if any of the following occurs in suitable habitat:¹

- does NOT affect local hydrology (permanently or temporarily)
- does NOT include alteration or fill of 3 or more acres of wetland
- does NOT disturb the ground or existing vegetation⁴
- does NOT include application of insecticides

May Affect

Projects that intersect Poweshiek Skipperling species list area or critical habitat (CH) may result in a May Affect (MA)⁵ determination if any of the following occurs in suitable habitat:¹

- will affect local hydrology (permanently or temporarily)
- includes alteration or fill of 3 or more acres of wetland
- disturbance of the ground or existing vegetation⁴
- application of insecticides

Poweshiek Skipperling References

MNDNR. (2022). Retrieved from Oarisma poweshiek (Parker, 1870):

<https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=IILEP57010#:~:text=The%20Poweshiek%20Skipperling%20is%20a,and%20have%20blunt%20tipped%20clubs.>

Swengel, A. (1998). Effects of management on butterfly abundance in tallgrass prairie and pine barrens. *Biological Conservation*, 83(1):77-89.

USFWS. (2014, October 24). *Endangered and Threatened Wildlife and Plants; Threatened Species Status for Dakota Skipper and Endangered Species Status for Poweshiek Skipperling*. Retrieved from US Federal Register: <https://www.govinfo.gov/content/pkg/FR-2014-10-24/pdf/2014-25190.pdf#page=1>

USFWS. (2015, October 1). *Endangered and Threatened Wildlife and Plants: Designation of Critical Habitat for the Dakota Skipper and Poweshiek Skipperling*. Retrieved from US Federal Register: <https://www.govinfo.gov/content/pkg/FR-2015-10-01/pdf/2015-24184.pdf#page=1>

USFWS. (2016, May). *Guidance for Interagency Cooperation under Section 7(a)(2) of the Endangered Species Act for the Dakota Skipper, Dakota Skipper Critical Habitat, and Poweshiek Skipperling Critical Habitat Version 1.1*. Retrieved from Midwest Region Endangered Species: <https://www.fws.gov/midwest/endangered/insects/dask/pdf/DakotaSkipperS7GuidanceV1.1.pdf>

- USFWS. (2019, September 30). *Poweshiek skipperling (Oarisma poweshiek) 5-Year Review: Summary and Evaluation*. Retrieved from USFWS ECOS:
https://ecos.fws.gov/docs/tess/species_nonpublish/2907.pdf
- USFWS. (2021, August 6). *Draft Recovery Plan for Poweshiek Skipperling (Oarisma poweshiek)*. Retrieved from USFWS ECOS:
https://ecos.fws.gov/docs/recovery_plan/POSK%20Draft%20Recovery%20Plan_06152021_508%20compliant.pdf
- USFWS. (2022). *Oarisma poweshiek Poweshiek skipperling*. Retrieved from USFWS:
<https://fws.gov/species/poweshiek-skipperling-oarisma-poweshiek>
- WDNR. (2020, October 8). *Species Guidance*. Retrieved from Poweshiek Skipperling (Oarisma poweshiek):
<https://dnr.wi.gov/topic/endangeredresources/animals.asp?mode=detail&speccode=iilep57010>

¹Poweshiek Skipperlings are dependent on remnant (unplowed) prairies. Poweshiek Skipperlings require wet to dry mesic prairie and fen habitat with native grasses, sedges, and a significant component of plants in the Sunflower family. Favorite nectar sources are Pale Purple Coneflower, Black-eyed Susan and Coneflower. Larvae are reported to feed primarily on Prairie Dropseed and Little Bluestem.

²No effect – The proposed project would result in no effect to this species and/or its federally designated critical habitat (if applicable). Further consultation with the USFWS Minnesota Wisconsin Ecological Services Field Office is not necessary for the project as described.

³NLAA – For projects that reach a “not likely to adversely affect” determination, there is a 30 day “verification period” to allow the USFWS to review the project details and ensure the action meets the criteria for a NLAA determination. Output letters will indicate that if the project proponent does not hear otherwise within that timeframe, the NLAA determination is verified and they can proceed with their action as described in the IPaC report and concurrence verification letter. This verification period allows the USFWS Minnesota Wisconsin Ecological Services Field Office to apply local knowledge to evaluation of the action and ensure actions do not have unanticipated impacts. Thus, there may be a small subset of actions for which the USFWS Minnesota Wisconsin Ecological Services Field Office may request additional information during this timeframe to verify the effects determination reached through the IPaC DKey.

⁴Off-road vehicle access, soil compaction, digging, seismic survey, directional drilling, heavy equipment, grading, trenching, placement of fill, pesticide application (herbicide, fungicide), vegetation management [including removal or maintenance using equipment or chemicals], cultivation, development.

⁵May affect – Further consultation with the USFWS Minnesota Wisconsin Ecological Services Field Office is necessary in order to discern if the activity would result in a “no effect”, “not likely to adversely affect”, or “likely to adversely affect” determination.

Appendix 19 – Prairie Bush-clover (*Lespedeza leptostachya*)

Prairie Bush-clover Species Summary

Prairie Bush-clover is currently listed by the U.S. Fish and Wildlife Service (USFWS) under the Endangered Species Act (ESA) as ‘threatened’ across its range (USFWS, 1987). Major threats to Prairie Bush-clover are land conversion and encroachment of invasive plant species, drought, and hybridization (USFWS, 2021a). The USFWS species profile for Prairie Bush-clover can be found at <https://ecos.fws.gov/ecp/species/4458>. Additional information can be found at <https://www.fws.gov/species/prairie-lespedeza-lespedeza-leptostachya>. A summary of the ecology of this species can be found in the USFWS Prairie Bush-clover recovery plan (USFWS, 1988), the most recent 5-year review (USFWS, 2021b), and the current Species Status Assessment (USFWS, 2021a). No critical habitat has been designated for this species.

Prairie Bush-clover Biological Information

Prairie Bush-clover is an herbaceous, perennial member of the pea family (Fabaceae). It has erect stems that may grow up to 3 feet (1 meter[m]) tall (USFWS, 1988). The plant has a clover-like leaf and linear or narrow oblong-shaped leaflets that are in clusters of 3. The leaflets are 0.8 to 1.6 inches (in) (2 to 4 centimeters [cm]) long and 0.1 to 0.3 in (2 to 8 millimeters [mm]) wide. Longer terminal leaflets are less than half as wide as they are long with petioles that range from 0.1 to 0.4 in (2 to 10 mm) in length (USFWS, 1988).

Flowering plants are between 9 and 18 in (22 and 45 cm) tall. Flowers occur individually or paired on spikes 0.8 to 1.6 in (2 to 4 cm) long and 0.2 to 0.3 in (5 to 8 mm) thick. Pale pink or cream-colored flowers bloom in mid-July. Later in the growing season, the species produces white, wooly fruit pods that are 0.1 to 0.2 in (3 to 4 mm) long (USFWS, 2021a).

Seed germination begins in May and continues through July (USFWS, 1988). Plants may take 5 years or more to reach maturity and can live 30 years (USFWS, 2021a). Plants may go dormant for 1 to 2 years in response to increased competition and/or lack of disturbance (i.e., grazing) (Bockenstedt, 2002) as cited in (USFWS, 2021a)).

Prairie Bush-clover leaves change from bright yellow-green in early summer to gray-green in late summer (MNDNR, 2020). The entire plant has a grayish-silver sheen, making it easy to distinguish from its more round-leaved cultivated relative, the Sweet Clover (MNDNR). The showy pink flowers (**Figure 1**) of Prairie Bush-clover are less often seen than the silvery-green pods because of the plant's short blooming season and its ability to produce pods directly from flowers that never open.

Prairie Bush-clover is capable of self-pollination but may also rely on cross pollination via wind or pollinators. All Prairie Bush-clover plants are capable of self-pollination with cleistogamous flowers, but some can reproduce sexually by having both chasmogamous and cleistogamous flowers. Chasmogamous flowers are showy and rely on pollinators for cross-pollination.

Pollinators are relatively unknown for Prairie Bush-clover, however, the following species have been documented on individual plants; Hairstreak Butterfly, Western Honeybee, Weevil species, Goldenrod Soldier Beetle, Skeletonizing Leaf Beetle or Flea Beetle, Halictid Bee, Snout Moth, Pennsylvania Ambush Bug, and Common Walking Stick ((Banai, 2008) as cited in (USFWS, 2021a)).

The best time to search for Prairie Bush-clover is when plants are in fruit, from August through September. Flowering plants can be seen from mid-July through early August, and the species can be recognized any time after early June. Seedlings can be recognized in the field until early August by the presence of the two round cotyledon leaves or a single round protoleaf below the trifoliate stem leaves (MNDNR, 2020).



Figure 1. Prairie Bush-clover (Phil Delphey, (USFWS, 2021a))

Prairie Bush-clover Suitable Habitat

Prairie bush-clover is found in dry prairie, dry-mesic prairie, bedrock prairie, and mesic prairies. The species occurs on disturbed sites, or prairie habitats that have been previously mowed, burned, cultivated, or grazed. They may also be found on undisturbed remnant prairie sites (USFWS, 2021a). Lack of fire, grazing, or other natural disturbance can lead prairie communities to transition to scrub-shrub or early successional habitat types, thereby eliminating Prairie Bush-clover habitat (USFWS, 2021b).

Prairie Bush-clover is generally found on gentle, north-facing slopes of 10 to 15 degrees, although they can also occur on east and west-facing slopes. They also occur at bedrock outcrop sites interspersed with

upland prairie (USFWS, 1988)(**Figure 2**). The species is usually found around the edges of slopes or within barely concave areas that are not subject to nutrient or herbicide input from drain-tile discharge (Nancy Sather, MNDNR, retired, pers. comm, June 30, 2021, as cited in (USFWS, 2021a)). Soil types include, but are not limited to fine silty loam, sand, fine sandy loam, or clay loam (USFWS, 1988). Prairie Bush-clover is found in full to partial sun (MinnesotaSeasons, 2022).



Figure 2. *Prairie Bush-clover suitable habitat (MNDNR)*

The Prairie Bush-clover occurs in Minnesota, Wisconsin, Illinois, and Iowa. There were 56 documented extant populations in Minnesota and 19 documented extant populations in Wisconsin in 2020 (USFWS, 2021a).

Prairie Bush-clover Critical Habitat

Critical habitat has not been designated for Prairie Bush-clover.

Prairie Bush-clover Determination Key Guidance

The proposed action is the compilation of many different types of projects that depending on their size and specific location often do not significantly affect any Federally listed threatened or endangered species or critical habitats in Minnesota and Wisconsin. Common project types include, but are not limited to, the following:

- Vegetation management, including mowing, forestry activities, prescribed burning, and harvest
- Construction, maintenance, operation, and/or removal of:
 - Roads/trails
 - Communication towers
 - Transmission/utility lines
 - Bridges/culverts
 - Oil/gas pipelines
 - Solar power facilities
 - Hydroelectric facilities/ dams

- Mines/quarries
- Canals/levees/dikes
- Commercial/residential/recreational developments
- Agricultural activities
- Site/habitat restoration/enhancement
- Shoreline protection/beach nourishment
- Dredging and filling of wetlands/waterbodies
- Military operations

No Effect

Projects that intersect the Prairie Bush-clover species list area may result in a No Effect (NE)¹ determination if both of the following apply:

- A survey was completed, and the Prairie Bush-clover was not detected.
 - Upload the survey results to IPaC. If unable to upload the survey to IPaC, email the survey results to the MNWI ES Field Office (TwinCities@fws.gov).
- The action area occurs in unsuitable habitat.

Not Likely to Adversely Affect

Projects that intersect the Prairie Bush-clover species list area may result in a Not Likely to Adversely Affect (NLAA)² determination if:

- There are restrictions on stream/hydrology-impacting or vegetation/ground-disturbing activities within the species list area/buffered habitat. Restrictions include actions that are likely to change the elevations of surface water upstream or downstream, or in the local groundwater (as estimated pre-action vs. post-action); as well as the potential to impact the riparian zone (up to 200 feet) or indirectly impact a stream or river (e.g., cut and fill, horizontal directional drilling, construction, vegetation removal, pesticide or fertilizer application, discharge, runoff of sediment or pollutants, increase in erosion).
- Restrictions on actions that may fragment habitat or create barriers to movement/dispersal within the species list area.

May Affect

Projects that intersect the Prairie Bush-clover species list area and have either determined presence through a survey or have not conducted a survey will result in a May Affect (MA)³ determination if any of the following occurs:

- Suitable habitat is present
- Suitable habitat is present in the surrounding area
- There are known elemental occurrences⁴ in the action area/surrounding area
- There is evidence of habitat fragmentation in the action area/surrounding area
- The action occurs during flowering season
- Wetland delineation or habitat assessment/survey suggest presence of the species
- The species is observed during a site visit or there are reports of presence
- Disturbance of the ground or existing vegetation⁵
- Indirect alteration of the habitat or resources of the listed plant(s)⁶
- Direct harm to the listed plant(s)⁷

Prairie Bush-clover References

- Banai, A. (2008). *The mystery of hybridization between the federally threatened Lespedeza leptostachya Englem. and its co-occurring congener L. capitata Michx. (Fabaceae)*. Thesis submitted to Northwestern University.
- Bockenstedt, P. (2002). *Monitoring of prairie bush-clover (Lespedeza leptostachya) in south-central Iowa*. Thesis submitted to the University of Northern Iowa.
- MinnesotaSeasons. (2022, January 12). *Prairie Bush Clover*. Retrieved from Minnesota Seasons: http://www.minnesotaseasons.com/Plants/prairie_bush_clover.html
- MNDNR. (2020). *Lespedeza leptostachya*. Retrieved from MNDNR: <https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=PDFAB27090>
- MNDNR. (n.d.). *Prairie Bush Clover A Threatened Midwestern Prairie Plant*. Retrieved from MNDNR: https://files.dnr.state.mn.us/natural_resources/ets/prairie_bush_clover.pdf
- USFWS. (1987, January 9). *Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for Lespedeza leptostachya (Prairie Bush-Clover)*. Retrieved from US Federal Register: <https://www.govinfo.gov/content/pkg/FR-1987-01-09/pdf/FR-1987-01-09.pdf#page=35>
- USFWS. (1988, October 6). *Prairie Bush Clover Recovery Plan*. Retrieved from USFWS ECOS: https://ecos.fws.gov/docs/recovery_plan/881006.pdf
- USFWS. (2021a, August 1). *Species Status Assessment for the Prairie Bush-Clover (Lespedeza leptostachya) Version 1.0*. Retrieved from USFWS ECOS: <https://ecos.fws.gov/ServCat/DownloadFile/206530>
- USFWS. (2021b, September 23). *Prairie Bush-Clover (Lespedeza leptostachys) 5-Year Review: Summary and Evaluation*. Retrieved from USFWS ECOS: https://ecos.fws.gov/docs/tess/species_nonpublish/3555.pdf
- WDNR. (2021, May 5). *Prairie Bush Clover (Lespedeza leptostachya) - Species Guidance*. Retrieved from WDNR: <https://dnr.wi.gov/topic/EndangeredResources/Plants.asp?mode=detail&SpecCode=PDFAB27090>

¹No effect – The proposed project would result in no effect to this species and/or its federally designated critical habitat (if applicable). Further consultation with the USFWS Minnesota Wisconsin Ecological Services Field Office is not necessary for the project as described.

²NLAA – For projects that reach a “not likely to adversely affect” determination, there is a 30 day “verification period” to allow the USFWS to review the project details and ensure the action meets the criteria for a NLAA determination. Output letters will indicate that if the project proponent does not hear otherwise within that timeframe, the NLAA determination is verified, and they can proceed with their action as described in the IPaC report and concurrence verification letter. This verification period allows the USFWS Minnesota Wisconsin Ecological Services Field Office to apply local knowledge to evaluation of the action and ensure actions do not have unanticipated impacts. Thus, there may be a small subset of actions for which the USFWS Minnesota Wisconsin Ecological Services Field Office may request additional information during this timeframe to verify the effects determination reached through the IPaC DKey.

³May affect – Further consultation with the USFWS Minnesota Wisconsin Ecological Services Field Office is necessary in order to discern if the activity would result in a “no effect”, “not likely to adversely affect”, or “likely to adversely affect” determination.

⁴Elemental occurrence data can be accessed from the Wisconsin Natural Heritage Inventory: <https://dnr.wisconsin.gov/topic/NHI> and the Minnesota Department of Natural Resources Natural Heritage Information System: <https://www.dnr.state.mn.us/nhnrp/nhis.html>

⁵This includes any off-road vehicle access, soil compaction, digging, seismic survey, directional drilling, heavy equipment, grading, trenching, placement of fill, pesticide application (herbicide, fungicide), vegetation management (including removal or maintenance using equipment or chemicals), cultivation, development, etc.

⁶For example, actions that cause a change in canopy cover, microclimate, humidity, increase in invasive species, hydrologic alterations, etc.

⁷For example, through mowing/haying, prescribed fire, herbicide application, trampling, increased herbivory, cutting/clearing, cultivation, crushing by vehicle, reduction to possession, etc.

Appendix 20 – Rufa Red Knot (*Calidris canutus rufa*)

Rufa Red Knot Species Summary

The Rufa Red Knot is currently listed by the U.S. Fish and Wildlife Service (USFWS) under the Endangered Species Act (ESA) as ‘threatened’ across its range (USFWS, 2014). Major threats to this species include the loss of both breeding and nonbreeding habitat, likely effects related to disruption of natural predator cycles on breeding grounds, reduced prey availability throughout nonbreeding range, and increasing frequency and severity of asynchronies (mismatches) in the timing of the annual migratory cycle relative to favorable food and weather conditions. The USFWS species profile can be found at <https://ecos.fws.gov/ecp/species/1864>. Additional information can be found at <https://www.fws.gov/species/red-knot-calidris-canutus-rufa>. A summary of the ecology of the species can be found in the draft recovery plan (USFWS, 2021a), the 5-year review (USFWS, 2021b) and the species status assessment (USFWS, 2020). Critical habitat for the Rufa Red Knot has been proposed (does not include Minnesota or Wisconsin) but has not yet been designated (USFWS, 2021c).

Rufa Red Knot Biological Information

The Rufa Red Knot is a small shorebird about the size of a robin. Rufa Red Knot size ranges from 10 to 11 inches (in) (25 to 28 centimeters [cm]) in length with a wingspan of 20 in (50.8 cm). It has a soft “quer-wer” call. The Rufa Red Knot is a white-breasted, mottled ashy-gray bird with a black bill. The black bill tapers steadily from a relatively thick base to a relatively fine tip; bill length is not much longer than head length. Legs are typically dark gray to black, but sometimes greenish in juveniles or older birds in non-breeding plumage.

Plumage can differ between the summer breeding season and the winter non-breeding season. Non-breeding (winter) plumage is dusky gray above and whitish below, while breeding (summer) plumage is rufous (red) on the face, breast, and upper belly. During migration and winter, the Rufa Red Knot color is more faded overall although the leg color can be greenish yellow; during migration, underparts of some individuals show traces of the “red” of spring. Additional winter plumage differences might include birds that are pale ashy gray above, from crown to rump, with feathers on back narrowly edged with white; underparts that are white, a breast that is lightly streaked and speckled, and flanks that are narrowly barred with gray (**Figure 1**). During the breeding season, the adult has a cinnamon-brown breast, throat, and sides of head; a dark gray line through the eye; a white abdomen and undertail coverts; uppertail coverts that are white and barred with black; and dark gray to black legs (**Figure 2**).



Figure 1. *Rufa Red Knot in winter coloration (Arthur Morris)*



Figure 2. *Rufa Red Knot in breeding coloration (Arthur Morris)*

Rufa Red Knot Suitable Habitat

The Rufa Red Knot is a migratory shorebird that breeds in the Canadian Arctic and winters in parts of the United States, the Caribbean, and South America. Some Rufa Red Knots fly more than 9,300 miles (14,967 km) from south to north every spring and repeat the trip in reverse every autumn, making this bird one of the longest-distance migrants in the animal kingdom. Major migration stopover areas occur along the Gulf coast and Atlantic coasts of North and South America.

Delaware Bay is the Rufa Red Knot's main stopover to feed on Horseshoe Crab eggs on its northward migration. This is approximately half-way to its wintering grounds, and the animals arrive at the stopover sites exhausted and hungry (Nature, 2017). Rufa Red Knots also use sites in the Great Lakes region and

have been regularly sighted in inland areas of the United States within the Atlantic and central flyways, including the coasts of the Great Lakes in Minnesota and Wisconsin.

Red Knot suitable habitat in the Great Lakes region includes beaches, dunes, mudflats, peat banks, sandbars, or shoals. In many wintering and stopover areas, quality high-tide roosting habitat (i.e., close to feeding areas, protected from predators, with sufficient space, free from excessive human disturbance) is limited. In non-breeding habitats, Rufa Red Knot requires sparse vegetation and open landscapes to avoid predation (USFWS, 2020). Inland stopover habitats may include riverine wetlands and manmade impoundments (USFWS, 2021a). Unvegetated or sparsely vegetated sand or mud flats and washover areas (**Figure 3**) are important. These are broad, unvegetated zones, with little or no topographic relief, that are formed and maintained by extreme wave action.

In Wisconsin, Rufa Red Knot suitable habitat includes Great Lakes beaches, emergent marshes, coastal plain marshes, floating-leaved marshes, and riverine and lacustrine mud flats (WDNR, 2015). The Rufa Red Knot occurs uncommonly during migration along coastal sandy beaches in Wisconsin from mid-May to early June in spring and from mid-July to early November in fall (WDNR, Overview, 2020). This species does not breed in Wisconsin.



Figure 3. Rufa Red Knot suitable habitat, Sturgeon Bay, MI (Andrea Rinne)

Rufa Red Knot Determination Key Guidance

The proposed action is the compilation of many different types of projects that depending on their size and specific location often do not significantly affect any federally listed threatened or endangered species or critical habitats in Minnesota and Wisconsin. Common project types include, but are not limited to, the following:

- Vegetation management, including mowing, forestry activities, prescribed burning, and harvest
- Construction, maintenance, operation, and/or removal of:
 - Roads/trails
 - Communication towers
 - Transmission/utility lines
 - Bridges/culverts
 - Oil/gas pipelines
 - Solar power facilities
 - Hydroelectric facilities/ dams
 - Mines/quarries
 - Canals/levees/dikes
- Commercial/residential/recreational developments
- Agricultural activities
- Site/habitat restoration/enhancement
- Shoreline protection/beach nourishment
- Dredging and filling of wetlands/waterbodies
- Military operations

No Effect

Projects that intersect the Rufa Red Knot species list area may result in a No Effect (NE)¹ determination if all of the following apply:

- The action intersects the Rufa Red Knot buffer zone²
- The action occurs outside of the Rufa Red Knot migration window.³

Not Likely to Adversely Affect

Projects that intersect the Rufa Red Knot species list area may result in a Not Likely to Adversely Affect (NLAA)⁴ determination if the action intersects the Rufa Red Knot buffer zone² AND all of the following apply:

- The action occurs during the Rufa Red Knot migration window³
- The action will NOT modify beaches, dunes, mudflats, peat banks, sandbars, shoals, or other Rufa Red Knot habitats⁵
- The action will NOT result in increased human disturbance or predation⁶ during the Rufa Red Knot migration window.³

May Affect

Projects that intersect the Rufa Red Knot species list area may result in a May Affect (MA)⁷ determination if:

- The action intersects the Rufa Red Knot buffer zone² and occurs during the migration window³ and the following applies:

- will result in modifications to the beaches, dunes, mudflats, peat banks, sandbars, shoals, or other Rufa Red Knot habitats.⁵
- The action intersects the Rufa Red Knot buffer zone² and occurs during the migration window³ and all of the following apply:
 - the action does NOT modify beaches, dunes, mudflats, peat banks, sandbars, shoals, or other Rufa Red Knot habitats⁵
 - the action will result in increased human disturbance or predation.⁶

Rufa Red Knot References

- Nature, M. (2017, June 30). *The rufa red knot*. Retrieved from Species Spotlight:
<https://michigannature.wordpress.com/2017/06/30/species-spotlight-the-rufa-red-knot/>
- USFWS. (2014, December 11). *Endangered and Threatened Wildlife and Plants; Threatened Species Status for the Rufa Red Knot*. Retrieved from US Federal Register:
<https://www.govinfo.gov/content/pkg/FR-2014-12-11/pdf/2014-28338.pdf#page=1>
- USFWS. (2018, August 17). *Shorebirds Effects Determination Guidance for Endangered & Threatened Species (EDGES)*. Retrieved from USFWS Ecosphere:
<https://www.fws.gov/sites/default/files/documents/2018-0817-EDGES-Knot-Plover.pdf>
- USFWS. (2020, September). *Species Status Assessment for the Rufa Red Knot (Calidris canutus rufa)*. Retrieved from USFWS ECOS: <https://ecos.fws.gov/ServCat/DownloadFile/187781>
- USFWS. (2021a, May 11). *Draft Recovery Plan for the Rufa Red Knot (Calidris canutus rufa)*. Retrieved from USFWS ECOS:
https://ecos.fws.gov/docs/recovery_plan/20210510_draft%20red%20knot%20recovery%20plan_final%20version%20for%20FRN.pdf
- USFWS. (2021b, July). *Rufa Red Knot (Calidris canutus rufa) 5-Year Review: Summary and Evaluation*. Retrieved from USFWS ECOS: https://ecos.fws.gov/docs/tess/species_nonpublish/3624.pdf
- USFWS. (2021c, July 15). *Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for Rufa Red Knot (Calidris canutus rufa)*. Retrieved from US Federal Register:
<https://www.govinfo.gov/content/pkg/FR-2021-07-15/pdf/2021-14406.pdf#page=1>
- WDNR. (2015). *Wisconsin Wildlife Action Plan*. Madison, WI: Wisconsin Department of Natural Resources.
- WDNR. (2020, October 8). *Overview*. Retrieved from Red Knot (*Calidris canutus rufa*):
[https://dnr.wi.gov/topic/EndangeredResources/Animals.asp?mode=detail&SpecCode=ABNNF11021#:~:text=Rufa%20Red%20Knot%20\(Calidris%20canutus,to%20early%20November%20in%20fall.](https://dnr.wi.gov/topic/EndangeredResources/Animals.asp?mode=detail&SpecCode=ABNNF11021#:~:text=Rufa%20Red%20Knot%20(Calidris%20canutus,to%20early%20November%20in%20fall.)

¹No effect – The proposed project would result in no effect to this species and/or its federally designated critical habitat (if applicable). Further consultation with the USFWS Minnesota Wisconsin Ecological Services Field Office is not necessary for the project as described.

²0.25 miles (354 m) from a Great Lakes shoreline.

³May 15 – June 15 OR July 1 – September 30.

⁴NLAA – For projects that reach a “not likely to adversely affect” determination, there is a 30 day “verification period” to allow the USFWS to review the project details and ensure the action meets the criteria for a NLAA determination. Output letters will indicate that if the project proponent does not hear otherwise within that timeframe, the NLAA determination is verified and they can proceed with their action as described in the IPaC report and concurrence verification letter. This verification period allows the USFWS Minnesota Wisconsin Ecological Services Field Office to apply local knowledge to evaluation of the action and ensure actions do not have unanticipated impacts. Thus, there may be a small subset of actions for which the USFWS Minnesota Wisconsin Ecological Services Field Office may request additional information during this timeframe to verify the effects determination reached through the IPaC DKey.

⁵For example, the following actions may modify Rufa Red Knot habitat: groins, jetties, sea walls, revetments, bulkheads, rip-rap, beach nourishment, nearshore dredging, dredge spoil disposal, sand mining/borrowing, beach bulldozing, sandbagging, sand fencing, vegetation planting/alteration/removal, deliberate or possible introduction of non-native vegetation, beach raking/mechanized grooming, boardwalks, aquaculture development.

⁶For example, is the action likely to indirectly increase access or use of red knot habitats by humans and/or predators at times of year that the birds are typically present (e.g., commercial/residential development, beach access structures, boardwalks, pavilions, bridges/roads/ferries/trails, marinas, posts or other avian predator perches, structures or habitat features likely to encourage predator nesting/denning, trash cans or other predator attractants, feral cat colonies, policy changes likely to increase human use).

⁷May affect – Further consultation with the USFWS Minnesota Wisconsin Ecological Services Field Office is necessary in order to discern if the activity would result in a “no effect”, “not likely to adversely affect”, or “likely to adversely affect” determination.

Appendix 21 – Rusty Patched Bumble Bee (*Bombus affinis*)

Rusty Patched Bumble Bee Species Summary

The RPBB is currently listed by the U.S. Fish and Wildlife Service (USFWS) under the Endangered Species Act (ESA) as ‘endangered’ across its range (USFWS, 2017). Prior to its listing as endangered in 2017, the species experienced a widespread and steep decline. The exact cause of the decline is unknown, but evidence suggests a synergistic interaction between an introduced pathogen and exposure to pesticides (specifically, insecticides and fungicides; (USFWS, 2016)). The remaining populations are exposed to several interacting stressors, including pathogens, pesticides, habitat loss and degradation, non-native and managed bees, the effects of climate change, and small population biology (USFWS, 2016). These stressors likely operate independently and synergistically (USFWS, 2021b). The USFWS species profile for the RPBB can be found at <https://ecos.fws.gov/ecp/species/9383>. Additional information can be found at <https://www.fws.gov/species/rusty-patched-bumble-bee-bombus-affinis>. A summary of the ecology of this species can be found in the USFWS RPBB recovery plan (USFWS, 2021b) and Species Status Assessment (USFWS, 2016). No critical habitat has been designated for this species.

Rusty Patched Bumble Bee Biological Information

The RPBB is a social species that forms colonies with a single queen, female workers, and males. Healthy RPBB colonies may include more than 1,000 workers (USFWS, 2021e). All RPBBs have entirely black heads, and workers and males have a rusty reddish patch located centrally on the abdomen (**Figures 1 to 3**). The patch varies from brown to orange and appears on the second segment of the abdomen. The hairs on the first segment are yellow and mostly yellow on the second segment, but with a central patch of rusty-brown-orange hair at the front edge of the segment going about halfway back. The rear edge of the second segment has entirely yellow hair, and the third segment is covered with black hair. The hairs on the thorax of the RPBB are yellow with a T-shaped (thumbtack) area of black hairs, with the top part of the T stretching between the wings and a thin line extending down the middle towards the back of the thorax (UM, 2023). Queens are 0.83 to 0.87 inches (in) (21 to 22 millimeters [mm]), workers are 0.43 to 0.63 in (11 to 16 mm) and males are 0.51 to 0.69 in (13 to 17.5 mm) (VDWR, 2020).

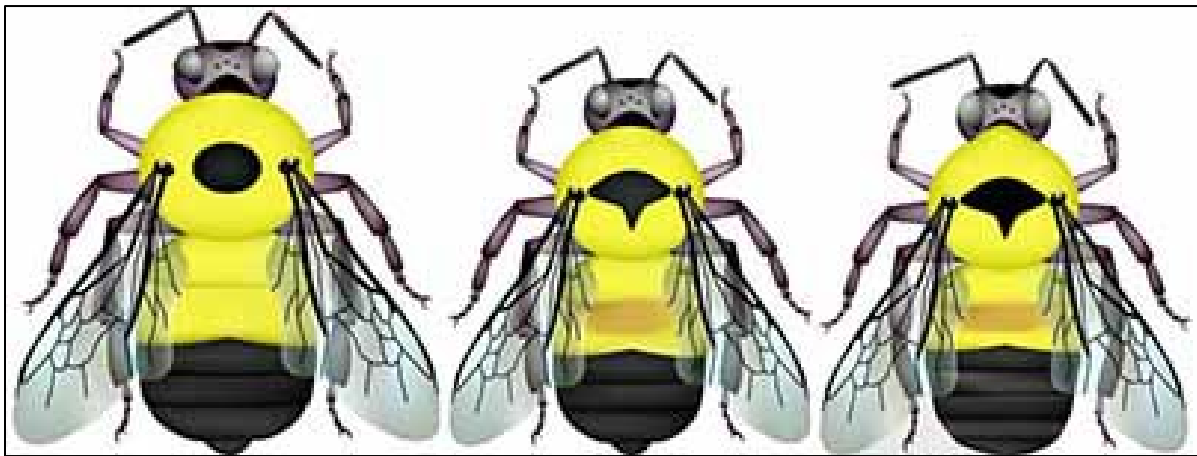


Figure 1. Illustrations of a RPBB queen (left), worker (center), and male (right) (Elaine Evans, The Xerces Society)



Figure 2. RPBB (Susan Day, USFWS) (USFWS, 2019)



Figure 3. RPBB (USFWS)

The RPBB annual cycle starts in early spring when colonies are initiated by solitary queens emerging from overwintering sites. RPBB queens store sperm from mating the previous autumn to fertilize eggs, after which the cycle progresses with the production of workers throughout the summer and ends with the production of males and new queens in late summer and early fall. Survival and successful recruitment require food from floral resources from early spring through fall, undisturbed nesting habitat in proximity to foraging resources, and overwintering habitat for the next year's queens. The optimal survey period for the RPBB is early-June through mid-August (WNHI, 2021).

In spring, the queen searches for suitable nest sites and collects nectar and pollen from flowers to support egg production. As workers hatch and the colony grows, the workers are responsible for food collection, colony defense, and care of the young. The queen continues to lay eggs, and in mid-July to September, new queens and males hatch from the eggs. At the end of the season, the queen dies and the new queen mates before hibernating.

Rusty Patched Bumble Bee Suitable Habitat

RPBBs have been observed in a variety of habitats, including prairies, woodlands, marshes, agricultural landscapes, and residential parks and gardens (Colla & Packer, 2008) (Colla & Dumesh, 2010) (USFWS unpublished geodatabase 2016). The RPBB requires areas that support sufficient food (nectar and pollen from diverse and abundant flowers), undisturbed nesting sites in proximity to floral resources, and overwintering sites for hibernating queens (Goulson, Nicholls, & Rotheray, 2015) (Potts, et al., 2010). Nectar plants include, but are not limited to, Buckeye, Hyssops, Asters, Sunflowers, Honeysuckles, Bee Balms, Obedient Plant, Plums/Cherries, Goldenrods, and Blueberry (WDNR, Rusty Patched Bumble Bee (*Bombus affinis*), 2020). RPBBs emerge early in the spring and go into hibernation late, so they rely on a range of flower species to meet their nutritional needs during this period from April through September (Macfarlane, Patten, Royce, Wyatt, & Mayer, 1994).

RPBB habitat can be divided conceptually into nesting and wintering and foraging habitat types (Figures 4 and 5) based on relative timing of pollen and nectar availability. The locations of pollen and nectar sources for the species may vary throughout the growing season (**Table 1**).



Figure 4. RPBB suitable habitat (MNDOT)



Figure 5. RPBB suitable habitat (Christy Stewart, Bumble Bee Watch)

Nests and Nesting Habitat

RPBB is assumed to nest in upland grasslands and shrublands that contain forage during the summer and fall and as far as 98 feet (ft) (30 meters [m]) into the edges of forest and woodland (USFWS, 2021d). RPBB nests are typically 1 to 4 ft (0.3 to 0.9 m) underground in abandoned rodent nests or other mammal burrows and occasionally at the soil surface or aboveground (Macfarlane, Patten, Royce, Wyatt, & Mayer, 1994). It is assumed that nests are typically within 0.6 miles (mi) (1 kilometer [km]) of foraging areas, although this may vary with the availability of floral resources (USFWS, 2021d). The nesting period in Minnesota and Wisconsin is April 9 to October 9 (USFWS, 2021c).

Spring Foraging Habitat

In the spring, the RPBB may depend on woodland habitat for spring ephemeral flowers and early blooming trees and shrubs. The spring foraging period is April 10 until forage is unavailable (USFWS, 2021e).

Summer and Fall Foraging

While the RPBB may visit blooming flowers within the typical foraging distance (0.6 mi [1 km]) of its nest, it is assumed that core foraging areas are those areas with concentrated resources (e.g., in the summer, open fields and prairies with large patches of blooming native flowers) where the RPBB can find pollen and nectar while minimizing energy expenditure. Summer and fall foraging are assumed to occur in upland forest or woodland edges, upland grasslands and shrublands, palustrine wetlands, and other areas nearby natural or semi natural areas. The summer foraging period is April 10 to October 10 (USFWS, 2021e).

Overwintering Habitat

RPBBs overwinter in small chambers in loose soil and/or leaf litter just a few centimeters below the ground or they use compost or rodent hills/mounds. Overwintering habitat is often in or near woodlands or woodland edges that contain spring blooming herbaceous plants, shrubs, and trees, which allows proximity to woodland spring blooming flowers, particularly spring ephemeral wildflowers, a critical early spring food source. The overwintering period in Minnesota and Wisconsin is October 10 to April 10 (USFWS, 2021c).

Table 1. RPBB habitats and their typical seasons of use in Minnesota and Wisconsin

Habitat Category	Nesting	Wintering	Spring Foraging	Summer and Fall Foraging	When RPBB May be Present North of 42°
Upland Forest & Woodland Interior		X			October 10 to April 10
Upland Forest & Woodland Interior			X		April 10 until forage is unavailable
Upland Forest & Woodland Edge (30-meter edge)	X	X	X	X	All year
Upland Grassland & Shrublands	X		X	X	April 10 to October 10
Palustrine wetlands, excluding ponds, and other acres where forage is not present			X	X	April 10 to October 10
Flower gardens, certain cropland, all similar areas within 1 kilometer of natural or semi-natural vegetation			X	X	April 10 to October 10

(USFWS, 2021e)

It is generally assumed that RPBBs only nest in natural or semi-natural vegetation, but the species forages in some ‘cultivated’ habitats such as sunflower fields, gardens, or plant nurseries. Restored/reconstructed prairies appear to have significant potential to foraging, nesting, and overwintering, depending on the type of habitat restored (USFWS, 2021e).

The RPBB species list area is divided into 3 zones: The High Potential Zone (HPZ), Low Potential Zone (LPZ) and Uncertain Zones. The HPZ is where RPBB is likely to be present where suitable habitat is present. The HPZs contain extant sites and the surrounding area considered to have the highest potential for the species to be present. An extant site is defined as a site where the RPBB has been documented in 2007 or later, unless surveyed sufficiently to be considered unoccupied (USFWS, 2019). The LPZ generally surrounds a HPZ and can be considered a primary dispersal zone but assumes the RPBB is not likely to be present. These areas are important for conservation and additional surveying. The Uncertain Zones are areas with historical presence, but without sufficient survey efforts to conclude species’ extirpation from the area (USFWS, 2021a).

Historically, the RPBB was broadly distributed across the eastern United States and upper Midwest, from Maine in the United States and southern Quebec and Ontario in Canada, south to the northeast corner of Georgia, reaching west to the eastern edges of North Dakota and South Dakota (USFWS, 2016). The species is extant in Wisconsin and Minnesota.

Rusty Patched Bumble Bee Critical Habitat

In 2020 the USFWS determined that designation of critical habitat is not prudent for the RPBB (USFWS, 2020). It was determined that the present or threatened destruction, modification, or curtailment of habitat is not the primary threat to the species, and the availability of habitat does not limit the conservation of the RPBB now, nor will it in the future.

Rusty Patched Bumble Bee Determination Key Guidance

The proposed action is the compilation of many different types of projects that, depending on their size and specific location, often do not significantly affect any federally listed threatened or endangered species or critical habitats in Minnesota and Wisconsin. Common project types include, but are not limited to, the following:

- Vegetation management, including mowing, forestry activities, prescribed burning, and harvest
- Construction, maintenance, operation, and/or removal of:
 - Roads/trails
 - Communication towers
 - Transmission/utility lines
 - Bridges/culverts
 - Oil/gas pipelines
 - Solar power facilities
 - Hydroelectric facilities/ dams
 - Mines/quarries
 - Canals/levees/dikes
- Commercial/residential/recreational developments
- Agricultural activities
- Site/habitat restoration/enhancement
- Shoreline protection/beach nourishment
- Dredging and filling of wetlands/waterbodies
- Military operations

No Effect

Projects that intersect the RPBB HPZ may result in a No Effect (NE)¹ determination if:

Option A

- The project does not result in construction of one or more new roads or rail lines; the addition of travel lanes that are likely to increase vehicle traffic on one or more existing roads; or other structures or activities that will increase vehicle traffic;
 - AND
- The action does not include or is not likely to cause the use of commercial/managed bees (e.g., the use of honeybees or managed bumble bees to pollinate crops);
 - AND
- The action area does not include nesting, foraging and/or overwintering habitat.

Option B

- The project does not result in construction of one or more new roads or rail lines; the addition of travel lanes that are likely to increase vehicle traffic on one or more existing roads; or other structures or activities that will increase vehicle traffic;
 - AND
- The action does not include or is not likely to cause the use of commercial/managed bees (e.g., the use of honeybees or managed bumble bees to pollinate crops);
 - AND

- The action area does include nesting, foraging and/or overwintering habitat;
 - AND
- Surveys² have been conducted according to USFWS approved protocols;
 - AND
- RPBB's were observed during the surveys;²
 - AND
- The action includes seed collection from native seeds;
 - AND
- The seed collection will not be carried out more frequently than once every 3 years in the 2.0-acre (or larger) area;
 - AND
- The action includes only seed collection and no other activity that could affect the RPBB or its habitat;
 - AND
- The action does not include, or will not cause the application of insecticides or fungicides; activities to control native rodent species; or planting or seeding of non-native plant species that are likely to degrade the quality of existing RPBB foraging habitat by decreasing the abundance or diversity of RPBB forage species;
 - AND
- The action includes only cut stump, or basal bark herbicide treatments;
 - AND
- Herbicide treatments will only be applied when the RPBB is not likely to be foraging on affected plants;
 - AND
- The action will not cause an increase in the extent or duration of surface flooding or soil saturation in RPBB habitat in a HPZ (i.e., as a result of activities or structures that impound water, otherwise alter or interrupt existing drainage patterns, or that affect surface runoff);
 - AND
- The action will not cause ground disturbance in an HPZ;
 - AND
- The action will not include or cause effects to vegetation in the RPBB habitat.

Not Likely to Adversely Affect

Projects that intersect the RPBB HPZ may result in a Not Likely to Adversely Affect (NLAA)³ determination if:

Option A

- The project does not result in construction of one or more new roads or rail lines; the addition of travel lanes that are likely to increase vehicle traffic on one or more existing roads; or other structures or activities that will increase vehicle traffic;
 - AND
- The action does not include or is not likely to cause the use of commercial/managed bees (e.g., the use of honeybees or managed bumble bees to pollinate crops);
 - AND
- The action area does include nesting, foraging and/or overwintering habitat;
 - AND
- Surveys² have been conducted according to USFWS approved protocols;

- AND
- RPBB's were not observed during the surveys².

Option B

- The project does not result in construction of one or more new roads or rail lines; the addition of travel lanes that are likely to increase vehicle traffic on one or more existing roads; or other structures or activities that will increase vehicle traffic;
 - AND
- The action does not include or is not likely to cause the use of commercial/managed bees (e.g., the use of honeybees or managed bumble bees to pollinate crops);
 - AND
- The action area does include nesting, foraging and/or overwintering habitat;
 - AND
- Surveys² have been conducted according to USFWS approved protocols;
 - AND
- RPBB's were observed during the surveys²;
 - AND
- The action includes seed collection from native seeds;
 - AND
- The seed collection will not be carried out more frequently than once every 3 years in the 2.0-acre (or larger) area;
 - AND
- The action includes only seed collection and no other activities that could affect the RPBB or its habitat.

Option C

- The project does not result in construction of one or more new roads or rail lines; the addition of travel lanes that are likely to increase vehicle traffic on one or more existing roads; or other structures or activities that will increase vehicle traffic;
 - AND
- The action does not include or is not likely to cause the use of commercial/managed bees (e.g., the use of honeybees or managed bumble bees to pollinate crops);
 - AND
- The action area does include nesting, foraging and/or overwintering habitat ;
 - AND
- Surveys² have been conducted according to USFWS approved protocols;
 - AND
- RPBB's were observed during the surveys²;
 - AND
- The action includes seed collection from native seeds;
 - AND
- The seed collection will not be carried out more frequently than once every 3 years in the 2.0-acre (or larger) area
 - AND
- The action does not include, or will not cause the application of insecticides or fungicides; activities to control native rodent species; or planting or seeding of non-native plant species that are likely to degrade the quality of existing RPBB foraging habitat by decreasing the abundance or

- diversity of RPBB forage species;
 - AND
- The action does not include the use of herbicide OR the action includes only cut stump, or basal bark herbicide treatments OR herbicide treatments are applied only when the RPBB is not likely to be foraging on affected plants;
 - AND
- The action will not cause an increase in the extent or duration of surface flooding or soil saturation in RPBB habitat in a HPZ (i.e., as a result of activities or structures that impound water, otherwise alter or interrupt existing drainage patterns, or that affect surface runoff);
 - AND
- The action will not cause ground disturbance in an HPZ that affects more than 0.25 acre (0.1 hectare) of RPBB nesting habitat during the nesting season;
 - AND
- The action will not cause ground disturbance in an HPZ that affects more than 0.25 acre (0.1 hectare) of RPBB overwintering habitat during the overwintering period;
 - AND
- The action will include or cause effects to vegetation in the RPBB habitat;
 - AND
- The action will cause effects to vegetation in RPBB habitat in the HPZ during the nesting period. Effects could occur because of mowing, cutting, grazing, prescribed fire, tree removal, spot-application of herbicide, tree clearing, and/or other activities;
 - AND
- The action will not cause effects during the nesting period to 2.0 acres (0.8 hectares) or more foraging habitat. This excludes effects to vegetation in newly planted habitats if they occur before the beginning of the third growing season after the initial seeding;
 - AND
- The action does not include the use of prescribed fire during the overwintering period that will affect any RPBB habitat that contains trees;
 - AND
- The action will not result in the permanent removal or conversion of any existing RPBB habitat at any time of the year;
 - OR
- The action will not result in the permanent removal or conversion of more than 2.0 acres (0.8 hectares) of any existing RPBB habitat at any time of the year.

May Affect/Contact the USFWS

Contact the USFWS for projects that intersect the RPBB HPZ or critical habitat (CH) and involve the following. This project may result in a May Affect⁴ or Consultation Required⁵ determination if they:

- Include native plant seed collection carried out more frequently than once every 3 years in the same 2 acre or larger area.
- Include or cause insect trapping, activities to control native rodent species, or application of insecticides or fungicides.
- Include herbicide application, but if it does, only spot spraying (application to individual weeds using a hand-held sprayer) and/or other methods that include only applications to individual weeds (e.g., wick wiping, cut-stump, or basal bark treatments) are permitted.

- Cause an increase in the extent or duration of surface flooding or soil saturation in RPBB habitat in a HPZ.
- Cause ground disturbance that affects more than 0.25 acre (0.1 hectare) of RPBB nesting habitat (upland grasslands, shrublands, and forest and woodland edges that contain native sources of pollen and nectar) in a HPZ during the nesting season.
- Cause effects to vegetation on 2.0 acres (0.8 hectare) or more of RPBB foraging habitat during the species' active season. This excludes effects to vegetation in newly established habitats if they occur before the third growing season after the initial seeding/planting.
- Result in the permanent removal or conversion of more than 2.0 acres (0.8 hectare) of RPBB habitat at any time of the year.
- Restore and enhance RPBB habitat through planting and establishment of native floral species.

Rusty Patched Bumble Bee References

- Colla, S., & Dumesh, S. (2010). The bumble bees of southern Ontario: Notes on natural history and distribution. *Journal of the Ecological Society of Southern Ontario*, 141:39-68.
- Colla, S., & Packer, L. (2008). Evidence for decline in eastern North America bumble bees (Hymenoptera: Apidae), with special focus on *Bombus affinis* Cresson. *Biodiversity Conservation*, 17:1379-1391.
- Goulson, D. E., Nicholls, C. B., & Rotheray, E. (2015). Bee declines driven by combined stress from parasites, pesticides, and lack of flowers. *Science*, 347: 1255957-1-1255957-9.
- Macfarlane, R., Patten, K., Royce, L., Wyatt, B., & Mayer, D. (1994). Management potential of sixteen North American bumble bee species. *Melandria*, 50:1-12.
- Potts, S., Biesmeijer, J., Kremen, C., Neumann, P., Schweiger, O., & Kunin, W. (2010). Global pollinator declines: Trends, impacts and drivers. *Trends in Ecological Evolution*, 25:345–353.
- UM. (2023, February 23). *Rusty patched bumble bee Identification*. Retrieved from University of Minnesota Bee Lab: <https://beelab.umn.edu/rusty-patched-bumble-bee>
- USFWS. (2016, June). *Rusty Patched Bumble Bee (Bombus affinis) Species Status Assessment Final Report, Version 1*. Retrieved from USFWS ECOS: <https://ecos.fws.gov/ServCat/DownloadFile/120109>
- USFWS. (2017, March 21). *Endangered and Threatened Wildlife and Plants; Endangered Species Status for Rusty Patched Bumble Bee*. Retrieved from US Federal Register: <https://www.govinfo.gov/content/pkg/FR-2017-01-11/pdf/2017-00195.pdf#page=1>
- USFWS. (2019, April 12). *Survey Protocols for the Rusty Patched Bumble Bee (Bombus affinis) Version 2.2*. Retrieved from Rusty Patched Bumble Bee Guidance for Surveyors and Researchers: https://www.fws.gov/midwest/endangered/insects/rpbb/pdf/Survey_Protocols_RPBB_12April2019.pdf
- USFWS. (2020, September 1). *Endangered and Threatened Wildlife and Plants; Determination That Designation of Critical Habitat is Not Prudent for the Rusty Patched Bumble Bee*. Retrieved from US Federal Register: <https://www.govinfo.gov/content/pkg/FR-2020-09-01/pdf/2020-17093.pdf#page=1>

- USFWS. (2021a, March 18). *Rusty Patched Bumble Bee Map*. Retrieved from Midwest Region Endangered Species: <https://www.fws.gov/midwest/endangered/insects/rpbb/rpbbmap.html>
- USFWS. (2021b, July). *Recovery Plan for Rusty Patched Bumble Bee (Bombus affinis)*. Retrieved from USFWS ECOS: https://ecos.fws.gov/docs/recovery_plan/Final%20Recovery%20Plan%20_Rusty%20Patched%20Bumble%20Bee_2021.pdf
- USFWS. (2021c, December 16). *Rusty Patched Bumble Bee Guidance for Project Proponents*. Retrieved from Midwest Region Endangered Species: <https://www.fws.gov/midwest/endangered/insects/rpbb/ProjectProponent.html>
- USFWS. (2021d). *MNWI DKey standing analysis_draft for SLOPES_12-14-2021*. Bloomington: MN WI SLOPES.
- USFWS. (2021e, December). *Rusty Patched Bumble Bee (Bombus affinis) Endangered Species Act Section 7(a)(2) Voluntary Implementation Guidance Version 3.1*. Retrieved from Midwest Region Endangered Species: <https://www.fws.gov/midwest/endangered/insects/rpbb/pdf/RPBB%20Section%207%20Guidance%20-%20Ver%203.1%20-%20Dec%202021%20Final%20508.pdf>
- VDWR. (2020, September 10). *Rusty Patched Bumble Bee*. Retrieved from Virginia Department of Wildlife Resources: <https://dwr.virginia.gov/wildlife/information/rusty-patched-bumble-bee/>
- WDNR. (2020, October 8). Retrieved from Rusty Patched Bumble Bee (*Bombus affinis*): <https://dnr.wi.gov/topic/endangeredresources/animals.asp?mode=detail&SpecCode=IIHYM24020>
- WNHI. (2021, June). *Wisconsin Natural Heritage Inventory (NHI) Screening Guidance for the Rusty Patched Bumble Bee (RPBB)*. Retrieved from <https://dnr.wi.gov/topic/endangeredresources/documents/NHIbeescreening.pdf>

¹No effect – The proposed project would result in no effect to this species and/or its federally designated critical habitat (if applicable). Further consultation with the USFWS Minnesota Wisconsin Ecological Services Field Office is not necessary for the project as described.

²USFWS recommends conducting surveys during four evenly spaced sampling periods between early-June and mid-August. Conduct surveys according to USFWS survey protocol at: https://www.fws.gov/sites/default/files/documents/Survey_Protocols_RPBB_12April2019.pdf

³NLAA – For projects that reach a “not likely to adversely affect” determination, there is a 30-day “verification period” to allow the USFWS to review the project details and ensure the action meets the criteria for an NLAA determination. Output letters will indicate that if the project proponent does not hear otherwise within that timeframe, the NLAA determination is verified, and they can proceed with their action as described in the IPaC report and concurrence verification letter. This verification period allows the USFWS Minnesota Wisconsin Ecological Services Field Office to apply local knowledge to evaluation of the action and ensure actions do not have unanticipated impacts. Thus, there may be a small subset of actions for which the USFWS Minnesota Wisconsin Ecological Services Field Office may request additional information during this timeframe to verify the effects determination reached through the IPaC DKey.

⁴May affect – Further consultation with the USFWS Minnesota Wisconsin Ecological Services Field Office is necessary in order to discern if the activity would result in a “no effect”, “not likely to adversely affect”, or “likely to adversely affect” determination.

⁵Consultation required – Further consultation with the USFWS Minnesota Wisconsin Ecological Services Field Office is necessary in order to discern if the activity would result in a “no effect”, “not likely to adversely affect”, or “likely to adversely affect” determination.

Appendix 22 – Sheepnose Mussel (*Plethobasus cyphus*)

Sheepnose Mussel Species Summary

The Sheepnose Mussel (formerly referred to as Bullhead Mussel) is currently listed by the U.S. Fish and Wildlife Service (USFWS) under the Endangered Species Act (ESA) as ‘endangered’ across its range (USFWS, 2012). Threats to the Sheepnose Mussel include isolation resulting from impoundments, channelization, chemical contaminants, sedimentation, and invasive species such as the Zebra Mussel (USFWS, 2020). The USFWS species profile for Sheepnose Mussel can be found at <https://ecos.fws.gov/ecp/species/6903>. Additional information can be found at <https://www.fws.gov/species/sheepnose-plethobasus-cyphus>. A summary of the ecology of this species can be found in the USFWS Sheepnose Mussel 5-year review (USFWS, 2020). No critical habitat has been designated for this species.

Sheepnose Mussel Biological Information

The Sheepnose Mussel is a medium-sized mussel that grows to about 5 inches (12.7 cm) in length. The shell is thick and solid, and the overall shape is slightly longer than wide and somewhat inflated. The Sheepnose Mussel shell is smooth, shiny, and light yellow to a dull yellowish brown, without lines or rays but with dark concentric ridges (**Figure 1**). The ridges result from periods when growth stops or slows. The pseudocardinal and lateral teeth are well-developed, and the inner shell is white with a shallow beak cavity. The Sheepnose Mussel resembles the Hickorynut, Round Pigtoe, Threehorn Wartyback, and Wabash Pigtoe (MNDNR, 2022).

Male Sheepnose Mussel release sperm into the river current and downstream females siphon in the sperm to fertilize their eggs. After fertilization, females store the developing larvae (glochidia) in their gills until they are expelled into the river current. Some of the glochidia attach themselves to the gills of host fish, where they develop further. If glochidia successfully attach to a host fish, they mature into juvenile mussels within a few weeks, then drop off. If they land on suitable habitat, glochidia grow and mature into adult mussels. Using fish as hosts allows the Sheepnose Mussel to move upstream and populate habitats it could not otherwise reach. Sheepnose Mussel are reported to live up to 30 years.

Adults are suspension-feeders that siphon water and feed on suspended algae, bacteria, detritus, and microscopic animals.

The only confirmed wild host for Sheepnose Mussel glochidia is the Sauger, although recent laboratory studies have successfully transferred Sheepnose Mussel glochidia on Fathead Minnow, Creek Chub, Central Stoneroller and Brook Stickleback.



Figure 1. Sheepnose Mussel (Kristen Lundh, USFWS)

Sheepnose Mussel Suitable Habitat

Sheepnose mussels live in larger rivers and streams where they are usually found in shallow areas with moderate to swift currents that flow over coarse sand and gravel (**Figure 2**). However, they have also been found in areas of mud, cobble, and boulders. In large rivers they may be found in deep runs. Adult mussels spend their entire lives partially or completely buried in the river bottom.



Figure 2. Wisconsin River (University of Wisconsin – Wisconsin Geological and Natural History Survey)

The Sheepnose Mussel is found across the Midwest and Southeast. It was always considered rare in the Mississippi River in Minnesota (MNDNR, 2022) and in Wisconsin where it occurs in the Wisconsin, Chippewa and Flambeau Rivers (WDNR, Sheepnose (*Plethobasus cyphus*), 2020).

Sheepnose Mussel Critical Habitat

Critical habitat has not been designated for the Sheepnose Mussel.

Sheepnose Mussel Determination Key Guidance

The proposed action is the compilation of many different types of projects that depending on their size and specific location, often do not significantly affect any Federally listed threatened or endangered species or critical habitats in Minnesota and Wisconsin. Common project types include, but are not limited to, the following:

- Vegetation management, including mowing, forestry activities, prescribed burning, and harvest
- Construction, maintenance, operation, and/or removal of:
 - Roads/trails
 - Communication towers
 - Transmission/utility lines
 - Bridges/culverts
 - Oil/gas pipelines
 - Solar power facilities
 - Hydroelectric facilities/ dams
 - Mines/quarries
 - Canals/levees/dikes
- Commercial/residential/recreational developments
- Agricultural activities
- Site/habitat restoration/enhancement
- Shoreline protection/beach nourishment
- Dredging and filling of wetlands/waterbodies
- Military operations

No Effect

Projects that intersect the Sheepnose Mussel species list area may result in a No Effect (NE)¹ determination if:

- The action will NOT permanently affect local hydrology
AND
- will NOT have any direct² impacts to a stream or river
AND
- does NOT have the potential to impact the riparian zone
OR
- will NOT have indirect³ impacts to a stream or river

Not Likely to Adversely Affect

Projects that intersect the species list area may result in a Not Likely to Adversely Affect (NLAA)⁵ determination if:

- An approved survey⁶ was conducted and Higgins Eye were not observed⁷ in the project area.

May Affect

Projects that intersect the Sheepnose Mussel species list area may result in a May Affect (MA)⁴ determination if:

- The action will temporarily or permanently affect local hydrology
OR
- will have any direct² or indirect³ impacts to a stream or river
OR
- has the potential to impact the riparian zone

Sheepnose Mussel References

- MNDNR. (2022). *Plethobasus cyphus (Rafinesque, 1820) Sheepnose*. Retrieved from MNDNR: <https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=IMBIV34030>
- USFWS. (2012, March 13). *Endangered and Threatened Wildlife and Plants; Determination of Endangered Status for the Sheepnose and Spectaclecase Mussels Throughout Their Range*. Retrieved from US Federal Register: <https://www.govinfo.gov/content/pkg/FR-2012-03-13/pdf/2012-5603.pdf#page=2>
- USFWS. (2020, August 28). *Sheepnose (Plethobasus cyphus) 5-Year Review: Summary and Evaluation*. Retrieved from USFWS ECOS: https://ecos.fws.gov/docs/tess/species_nonpublish/3077.pdf
- WDNR. (2020, October 8). *Sheepnose (Plethobasus cyphus)*. Retrieved from WDNR: <https://dnr.wi.gov/topic/EndangeredResources/Animals.asp?mode=detail&SpecCode=IMBIV34030>

¹No effect – The proposed project would result in no effect to this species and/or its federally designated critical habitat (if applicable). Further consultation with the USFWS Minnesota Wisconsin Ecological Services Field Office is not necessary for the project as described.

²Horizontal Directional Drilling, hydrostatic testing, stream/road crossings, new stormwater outfall discharge, dams, other in-stream work, etc.

³Cut and fill, horizontal directional drilling, construction, vegetation removal, pesticide or fertilizer application, discharge, runoff of sediment or pollutants, increase in erosion, etc.

⁴May affect – Further consultation with the USFWS Minnesota Wisconsin Ecological Services Field Office is necessary in order to discern if the activity would result in a “no effect”, “not likely to adversely affect”, or “likely to adversely affect” determination.

⁵NLAA – For projects that reach a “not likely to adversely affect” determination, there is a 30 day “verification period” to allow the USFWS to review the project details and ensure the action meets the criteria for a NLAA determination. Output letters will indicate that if the project proponent does not hear otherwise within that timeframe, the NLAA determination is verified and they can proceed with their action as described in the IPaC report and concurrence verification letter. This verification period allows the USFWS Minnesota Wisconsin Ecological Services Field Office to apply local knowledge to evaluation of the action and ensure actions do not have unanticipated impacts. Thus, there may be a small subset of actions for which the USFWS Minnesota Wisconsin Ecological Services Field Office may request additional information during this timeframe to verify the effects determination reached through the IPaC Dkey.

⁶You must receive prior approval for any proposed mussel survey by contacting the Minnesota-Wisconsin Ecological Services Field Office. All mussel surveys in Minnesota and Wisconsin must comply with State approved protocols.

Minnesota Mussel Protocol: <https://files.dnr.state.mn.us/eco/nhnrp/mn-mussel-survey-and-relocation-protocol.pdf>.

Wisconsin Mussel Protocol:

https://molluskconservation.org/Library/Protocol%20PDFs/WI%20Wadable%20Mussel%20Protocol_8-18-15.pdf

⁷A positive observation includes collection of any shells (live or dead and in any condition)

Appendix 23 – Snuffbox Mussel (*Epioblasma triquetra*)

Snuffbox Mussel Species Summary

The Snuffbox Mussel is currently listed by the U.S. Fish and Wildlife Service (USFWS) under the Endangered Species Act (ESA) as ‘endangered’ across its range (USFWS, 2012a). Habitat destruction and modification, primarily due to the construction of dams and impoundments are the main threats to the Snuffbox Mussel. Invasive species such as the Zebra Mussel can negatively impact the species and their host fish. Water quality degradation from point and non-point sources, dredging, channelization, oil and gas production and sand and gravel mining are also a threat (USFWS, 2019). The USFWS species profile for Snuffbox Mussel can be found at <https://ecos.fws.gov/ecp/species/4135>. Additional information can be found at <https://www.fws.gov/species/snuffbox-epioblasma-triquetra>. A summary of the ecology of this species can be found in the USFWS Snuffbox Mussel most recent 5-year review (USFWS, 2019). No critical habitat has been designated for this species.

Snuffbox Mussel Biological Information

The Snuffbox Mussel has a thick, triangular shaped shell with a sharply defined, broadly expanded posterior slope (**Figure 1**). The epidermis is yellow or yellowish-green with green rays, blotches or chevron markings. Males are triangular shaped, while females are somewhat elongate. The anterior end of the shell is rounded, and the posterior end is truncated in males, but expanded in females. The beak sculpture has 3 or 4 faint, double-looped bars. The beak cavity is fairly deep, and the nacre is pearly white (WDNR, Snuffbox (*Epioblasma triquetra*), 2020). Males can grow to 2.8 inches (in) (7.1 centimeters [cm]) long, while females can grow to 1.8 in (4.6 cm) (USFWS, 2012b).

Male Snuffbox Mussels release sperm in the water column that is then siphoned by the female to fertilize her eggs. Fertilized eggs develop into microscopic larvae, called glochidia, within special gill chambers. After brooding for up to 7 months, the female expels mature glochidia, which then must attach to the gills or fins of a specific host fish species to complete development into juvenile mussels. If successfully attached to a host fish, glochidia mature within a few weeks. Juvenile mussels then drop off and continue to grow, if they fall onto appropriate substrate. Using fish as a host species allows the snuffbox to move upstream and populate habitats it could not reach otherwise. Known Snuffbox Mussel host fish are Log Perch and Banded Sculpin. Breeding occurs from May to July (WDNR, Snuffbox (*Epioblasma triquetra*), 2020).

Snuffbox Mussels are suspension feeders. They feed on algae, bacteria, detritus, microscopic animals and dissolved organic material (USFWS, 2012b).



Figure 1. Snuffbox Mussel (Thomas Watters, Ohio State University)

Snuffbox Mussel Suitable Habitat

The Snuffbox Mussel is usually found in small to medium-sized creeks, inhabiting areas with a swift current, although it is also found in Lake Erie and some larger rivers (**Figure 2**). In Wisconsin, it can be found in very clean gravel riffles of medium to large rivers (WDNR, Snuffbox (*Epioblasma triquetra*), 2020). Adults often burrow deep in sand, gravel, or cobble substrates, except when they are spawning, or the females are attempting to attract host fish.



Figure 2. St. Croix River (National Park Service)

In Wisconsin, the Snuffbox Mussel can be found in the St. Croix, Embarrass, Wolf and Little Wolf Rivers. In Minnesota, the species can be found in the Mississippi and St. Croix Rivers (USFWS, 2019), where it is confined to a small reach between Taylors Falls and Franconia (MNDNR, 2022).

Snuffbox Mussel Critical Habitat

Critical habitat has not been designated for the Snuffbox Mussel.

Snuffbox Mussel Determination Key Guidance

The proposed action is the compilation of many different types of projects that depending on their size and specific location often do not significantly affect any Federally listed threatened or endangered species or critical habitats in Minnesota and Wisconsin. Common project types include, but are not limited to, the following:

- Vegetation management, including mowing, forestry activities, prescribed burning, and harvest
- Construction, maintenance, operation, and/or removal of:
 - Roads/trails
 - Communication towers
 - Transmission/utility lines
 - Bridges/culverts
 - Oil/gas pipelines
 - Solar power facilities
 - Hydroelectric facilities/ dams
 - Mines/quarries
 - Canals/levees/dikes
- Commercial/residential/recreational developments
- Agricultural activities
- Site/habitat restoration/enhancement
- Shoreline protection/beach nourishment
- Dredging and filling of wetlands/waterbodies
- Military operations

No Effect

Projects that intersect the Snuffbox Mussel species list area may result in a No Effect (NE)¹ determination if:

- The action will NOT permanently affect local hydrology
AND
- will NOT have any direct² impacts to a stream or river
AND
- does NOT have the potential to impact the riparian zone
OR
- will NOT have indirect³ impacts to a stream or river

Not Likely to Adversely Affect

Projects that intersect the species list area may result in a Not Likely to Adversely Affect (NLAA)⁵ determination if:

- An approved survey⁶ was conducted and Higgins Eye were not observed⁷ in the project area.

May Affect

Projects that intersect the Snuffbox Mussel species list area may result in a May Affect (MA)⁴ determination if:

- The action will temporarily or permanently affect local hydrology
OR
- will have any direct² or indirect³ impacts to a stream or river
OR
- has the potential to impact the riparian zone

Snuffbox Mussel References

- MNDNR. (2022). *Epioblasma triquetra* (Rafinesque, 1820) Snuffbox. Retrieved from MNDNR: <https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=IMBIV16190>
- USFWS. (2012a, February 14). *Endangered and Threatened Wildlife and Plants; Determination of Endangered Status for the Rayed Bean and Snuffbox Mussels Throughout Their Ranges*. Retrieved from US Federal Register: <https://www.govinfo.gov/content/pkg/FR-2012-02-14/pdf/2012-2940.pdf#page=2>
- USFWS. (2012b, January). *Spectaclecase (a freshwater mussel) Cumberlandia monodonta Factsheet*. Retrieved from UFWS: https://www.fws.gov/sites/default/files/documents/508_spectaclecase%20fact%20sheet.pdf
- USFWS. (2019, February 20). *Snuffbox (Epioblasma triquetra) 5-Year Review: Summary and Evaluation*. Retrieved from USFWS ECOS: https://ecos.fws.gov/docs/tess/species_nonpublish/2680.pdf
- WDNR. (2020, October 8). *Snuffbox (Epioblasma triquetra)*. Retrieved from WDNR: [https://dnr.wi.gov/topic/EndangeredResources/Animals.asp?mode=detail&SpecCode=IMBIV16190#:~:text=Snuffbox%20\(Epioblasma%20triquetra\)%20is%20both,populations%20are%20small%20and%20local.](https://dnr.wi.gov/topic/EndangeredResources/Animals.asp?mode=detail&SpecCode=IMBIV16190#:~:text=Snuffbox%20(Epioblasma%20triquetra)%20is%20both,populations%20are%20small%20and%20local.)

¹No effect – The proposed project would result in no effect to this species and/or its federally designated critical habitat (if applicable). Further consultation with the USFWS Minnesota Wisconsin Ecological Services Field Office is not necessary for the project as described.

²Horizontal Directional Drilling, hydrostatic testing, stream/road crossings, new stormwater outfall discharge, dams, other in-stream work, etc.

³Cut and fill, horizontal directional drilling, construction, vegetation removal, pesticide or fertilizer application, discharge, runoff of sediment or pollutants, increase in erosion, etc.

⁴May affect – Further consultation with the USFWS Minnesota Wisconsin Ecological Services Field Office is necessary in order to discern if the activity would result in a “no effect”, “not likely to adversely affect”, or “likely to adversely affect” determination.

⁵NLAA – For projects that reach a “not likely to adversely affect” determination, there is a 30 day “verification period” to allow the USFWS to review the project details and ensure the action meets the criteria for a NLAA determination. Output letters will indicate that if the project proponent does not hear otherwise within that timeframe, the NLAA determination is verified and they can proceed with their action as described in the IPaC report and concurrence verification letter. This verification period allows the USFWS Minnesota Wisconsin Ecological Services Field Office to apply local knowledge to evaluation of the action and ensure actions do not have unanticipated impacts. Thus, there may be a small subset of actions for which the USFWS Minnesota Wisconsin Ecological Services Field Office may request additional information during this timeframe to verify the effects determination reached through the IPaC Dkey.

⁶You must receive prior approval for any proposed mussel survey by contacting the Minnesota-Wisconsin Ecological Services Field Office. All mussel surveys in Minnesota and Wisconsin must comply with State approved protocols.

Minnesota Mussel Protocol: <https://files.dnr.state.mn.us/eco/nhnrp/mn-mussel-survey-and-relocation-protocol.pdf>.

Wisconsin Mussel Protocol:

https://molluskconservation.org/Library/Protocol%20PDFs/WI%20Wadable%20Mussel%20Protocol_8-18-15.pdf

⁷A positive observation includes collection of any shells (live or dead and in any condition)

Appendix 24 – Spectaclecase Mussel (*Cumberlandia monodonta*)

Spectaclecase Mussel Species Summary

The Spectaclecase Mussel is currently listed by the U.S. Fish and Wildlife Service (USFWS) under the Endangered Species Act (ESA) as ‘endangered’ across its range (USFWS, 2012a). Habitat destruction and modification, primarily due to the construction of dams and impoundments are the main threats to the Spectaclecase Mussel (USFWS, 2019). Invasive species such as the Zebra Mussel can negatively impact the species and their host fish. Water quality degradation from point and non-point sources, dredging, channelization, and sedimentation also harm the species. The USFWS species profile for Spectaclecase Mussel can be found at <https://ecos.fws.gov/ecp/species/7867#recovery>. Additional information can be found at <https://fws.gov/species/spectaclecase-cumberlandia-monodonta>. A summary of the ecology of this species can be found in the USFWS Spectaclecase Mussel recovery outline (USFWS, 2014) and the most recent 5-year review (USFWS, 2019). No critical habitat has been designated for this species.

Spectaclecase Mussel Biological Information

The Spectaclecase Mussel is a large mussel that can grow up to 9 inches (23 centimeters) in length. The shape of the shell is elongated, sometimes curved, and somewhat inflated (USFWS, 2012b) with a concave ventral margin (**Figures 1 and 2**). The outside of the shell is dark brown to black, and rayless. The pseudocardinal teeth are poorly developed, lateral teeth are absent, and the inside of the shell is white (MNDNR, *Cumberlandia monodonta* (Say, 1829) Spectaclecase , 2022). The shell is thin in young individuals, becoming thicker with age (WDNR, Spectaclecase (*Cumberlandia monodonta*), 2020). The beak sculpture has 3 or 4 heavy ridges.

Male Spectaclecase Mussels release sperm in the water column that is then siphoned by the female to fertilize her eggs. Fertilized eggs develop into microscopic larvae, called glochidia, within special gill chambers. After brooding, the female expels mature glochidia, which then must attach to the gills or fins of a specific host fish species to complete development into juvenile mussels. If successfully attached to a host fish, glochidia mature within a few weeks. Juvenile mussels then drop off and continue to grow if they fall onto appropriate substrate. Using fish as a host species allows the Spectaclecase Mussel to move upstream and populate habitats it could not reach otherwise. Known Spectaclecase Mussel host fish are Mooneye and Goldeye (Sietman, et al., 2017). Breeding occurs from May to July (WDNR, Spectaclecase (*Cumberlandia monodonta*), 2020).

Adult Spectaclecase Mussels are suspension-feeders, siphoning water and feeding on suspended algae, bacteria, detritus, microscopic animals, and dissolved organic material. Adult mussels spend their entire lives partially or completely buried within river bottom substrates.



Figure 1. Spectaclecase Mussel (Tamara Smith, USFWS)



Figure 2. Spectaclecase Mussel (Tamara Smith, USFWS)

Spectaclecase Mussel Suitable Habitat

Spectaclecase Mussels are found in large rivers where they live in areas sheltered from the main force of the river current (**Figure 3**). This species may cluster in microhabitats in firm mud and in sheltered areas, such as beneath rock slabs, between boulders and even under tree roots. It occurs in substrates from mud and sand to gravel, cobble, and boulders in relatively shallow riffles and shoals with a slow to swift current.



Figure 3. St. Croix River, WI (Wisconsin Trail Guide)

In Wisconsin and Minnesota, Sietman et al. (2017) documented a large, reproducing population of Spectaclecase Mussels below the St. Croix Falls dam, but found the small population above the dam to be in decline, suggesting a lack of host fish in that area (Sietman, et al., 2017).

Spectaclecase Mussel Critical Habitat

Critical habitat has not been designated for the Spectaclecase Mussel.

Spectaclecase Mussel Determination Key Guidance

The proposed action is the compilation of many different types of projects that depending on their size and specific location often do not significantly affect any Federally listed threatened or endangered species or critical habitats in Minnesota and Wisconsin. Common project types include, but are not limited to, the following:

- Vegetation management, including mowing, forestry activities, prescribed burning, and harvest
- Construction, maintenance, operation, and/or removal of:
 - Roads/trails
 - Communication towers
 - Transmission/utility lines
 - Bridges/culverts
 - Oil/gas pipelines
 - Solar power facilities
 - Hydroelectric facilities/ dams
 - Mines/quarries
 - Canals/levees/dikes
- Commercial/residential/recreational developments
- Agricultural activities
- Site/habitat restoration/enhancement
- Shoreline protection/beach nourishment
- Dredging and filling of wetlands/waterbodies
- Military operations

No Effect

Projects that intersect the Spectaclecase Mussel species list area may result in a No Effect (NE)¹ determination if:

- The action will NOT permanently affect local hydrology
AND
- will NOT have any direct² impacts to a stream or river
AND
- does NOT have the potential to impact the riparian zone
OR
- will NOT have indirect³ impacts to a stream or river

Not Likely to Adversely Affect

Projects that intersect the species list area may result in a Not Likely to Adversely Affect (NLAA)⁵ determination if:

- An approved survey⁶ was conducted and Higgins Eye were not observed⁷ in the project area.

May Affect

Projects that intersect the Spectaclecase Mussel species list area may result in a May Affect (MA)⁴ determination if:

- The action will temporarily or permanently affect local hydrology
OR
- will have any direct² or indirect³ impacts to a stream or river
OR
- has the potential to impact the riparian zone

Spectaclecase Mussel References

- MNDNR. (2022). *Cumberlandia monodonta* (Say, 1829) *Spectaclecase* . Retrieved from MNDNR:
<https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=IMBIVO8010#:~:text=Currently%2C%20the%20spectaclecase%20mussel%20is,Dreissena%20polymorpha%20into%20the%20river.>
- Sietman, B., Davis, M., Hove, M., Pletta, M., Wagner, T., Marr, S., . . . Sampson, A. (2017, September). *Cumberlandia monodonta* – Host Enigma Resolved. *Ellipsaria*, pp. Vol. 19 - No. 3 pg. 18 - 20 .
- USFWS. (2012a, March 13). *Endangered and Threatened Wildlife and Plants; Determination of Endangered Status for the Sheepnose and Spectaclecase Mussels Throughout Their Range*. Retrieved from US Federal Register: <https://www.govinfo.gov/content/pkg/FR-2012-03-13/pdf/2012-5603.pdf#page=2>
- USFWS. (2012b, January). *Spectaclecase (a freshwater mussel) Cumberlandia monodonta Factsheet*. Retrieved from UFWS:
https://www.fws.gov/sites/default/files/documents/508_spectaclecase%20fact%20sheet.pdf
- USFWS. (2014, January 6). *Recovery Outline For the Spectaclecase mussel (Cumberlandia monodonta)*. Retrieved from USFWS ECOS:
https://ecos.fws.gov/docs/recovery_plan/FINAL%20Spectaclecase%20Recovery%20Outline.pdf
- USFWS. (2019, August 12). *Spectaclecase (Cumberlandia monodonta) 5-Year Review: Summary and Evaluation*. Retrieved from USFWS ECOS:
https://ecos.fws.gov/docs/tess/species_nonpublish/2760.pdf
- WDNR. (2020, October 8). *Spectaclecase (Cumberlandia monodonta)*. Retrieved from WDNR:
<https://dnr.wi.gov/topic/EndangeredResources/Animals.asp?mode=detail&SpecCode=IMBIV08010>

¹No effect – The proposed project would result in no effect to this species and/or its federally designated critical habitat (if applicable). Further consultation with the USFWS Minnesota Wisconsin Ecological Services Field Office is not necessary for the project as described.

²Horizontal Directional Drilling, hydrostatic testing, stream/road crossings, new stormwater outfall discharge, dams, other in-stream work, etc.

³Cut and fill, horizontal directional drilling, construction, vegetation removal, pesticide or fertilizer application, discharge, runoff of sediment or pollutants, increase in erosion, etc.

⁴May affect – Further consultation with the USFWS Minnesota Wisconsin Ecological Services Field Office is necessary in order to discern if the activity would result in a “no effect”, “not likely to adversely affect”, or “likely to adversely affect” determination.

⁵NLAA – For projects that reach a “not likely to adversely affect” determination, there is a 30 day “verification period” to allow the USFWS to review the project details and ensure the action meets the criteria for a NLAA determination. Output letters will indicate that if the project proponent does not hear otherwise within that timeframe, the NLAA determination is verified and they can proceed with their action as described in the IPaC report and concurrence verification letter. This verification period allows the USFWS Minnesota Wisconsin Ecological Services Field Office to apply local knowledge to evaluation of the action and ensure actions do not have unanticipated impacts. Thus, there may be a small subset of actions for which the USFWS Minnesota Wisconsin Ecological Services Field Office may request additional information during this timeframe to verify the effects determination reached through the IPaC Dkey.

⁶You must receive prior approval for any proposed mussel survey by contacting the Minnesota-Wisconsin Ecological Services Field Office. All mussel surveys in Minnesota and Wisconsin must comply with State approved protocols.

Minnesota Mussel Protocol: <https://files.dnr.state.mn.us/eco/nhnrp/mn-mussel-survey-and-relocation-protocol.pdf>.

Wisconsin Mussel Protocol:

https://molluskconservation.org/Library/Protocol%20PDFs/WI%20Wadable%20Mussel%20Protocol_8-18-15.pdf

⁷A positive observation includes collection of any shells (live or dead and in any condition)

Appendix 25 – Topeka Shiner (*Notropis topeka*)

Topeka Shiner Species Summary

The Topeka Shiner is currently listed by the U.S. Fish and Wildlife Service (USFWS) under the Endangered Species Act (ESA) as ‘endangered’ across its range (USFWS, 1998). Major threats to the Topeka Shiner in Minnesota include altered hydrology, fragmentation, land conversion, and sedimentation (USFWS, 2018). Channelization, construction of impoundments, mining, and an introduction of predator fish have also reduced Topeka Shiner populations (USFWS, 2019a). The USFWS species profile for the Topeka Shiner can be found at <https://ecos.fws.gov/ecp/species/4122>. Additional information can be found at <https://fws.gov/species/topeka-shiner-notropis-topeka>. A summary of the ecology of this species can be found in the USFWS Topeka Shiner recovery plan (USFWS, 2021a), the most recent 5-year review (USFWS, 2021b), and the current Species Status Assessment (USFWS, 2018). An experimental, non-essential population exists in Missouri.

Topeka Shiner Biological Information

The Topeka Shiner is a small minnow, normally less than 3 inches (7.6 centimeters) long (**Figure 1**). The species has a short head with a small, moderately sloping mouth (USFWS, 2018). It is silvery green with a distinct dark stripe preceding the dorsal fin and a dusky stripe along the entire length of the fish (**Figure 2**). The scales above this line are outlined with dark pigment, appearing cross-hatched, while the scales below this line have no pigment, appearing silvery-white in color (USFWS, 2019a). A chevron-like spot exists at the base of the caudal (tail) fin (USFWS, 2018). Topeka Shiners are omnivorous opportunists (USFWS, 2019a).

Topeka Shiners are rapidly maturing, short-lived fish with rapid larval growth and high population turnover rates (USFWS, 2021a). They mature sometime during the spring or summer of their second year (at 11 - 13 months of age). Their spawning season lasts for 8 to 10 weeks starting in mid-May to early June when water temperatures reach 22°C (71.6°F). They do not build their own nest but share a nest with Orange-spotted or Green Sunfish. Topeka Shiners are broadcast spawners with eggs and sperm released into the water and fertilization occurring externally (USFWS, 2021a). Females produce average clutch sizes ranging from 300 to 800 eggs depending on the size and condition of the female. The prolonged spawning and ability to have multiple clutches increases females’ chances of successful reproduction (USFWS, 2018). At 22°C it takes about 5 days for the eggs to hatch and another 4 days before the larvae begin to feed (USFWS, 2019a).



Figure 1. Topeka Shiner (Bryan Simmons, USFWS)



Figure 2. Topeka Shiner (Bryan Simmons, USFWS)

Topeka Shiner Suitable Habitat

Topeka Shiners live in small to mid-size prairie streams where they are usually found in pool and run areas (**Figure 3**). In Minnesota, Topeka Shiners also live in oxbows and off-channel pools (USFWS, 2019a). Suitable streams tend to have good water quality and cool to moderate temperatures. Many of these streams have year-round flow into larger downstream streams or rivers (USFWS, 2021a), although some may become dry during summer or periods of prolonged drought.

In Minnesota, Topeka Shiners occur only in streams of the Missouri River drainage in the southwestern corner of the state. They inhabit the Rock River and many of its tributaries, as well as many of the streams that flow into Big Sioux drainage of South Dakota. These low-gradient, slow-moving streams are naturally winding, with sand, gravel, or rubble substrate usually covered by a deep layer of silt (**Figure 4**). Topeka Shiners prefer pool-like areas outside the main channel courses that are in contact with groundwater and usually contain vegetation and areas of exposed gravel. Topeka Shiners are almost always found with Sand Shiners, Orange-spotted or Green Sunfish, Fathead Minnows, White Suckers, and Black Bullheads (USFWS, 2019a).



Figure 3. Topeka Shiner suitable habitat (USFWS, 2018)



Figure 4. Topeka Shiner suitable habitat (USFWS, 2019b)

Topeka Shiner Critical Habitat

Critical habitat was designated for the Topeka Shiner in 2004 (USFWS, 2004). Critical habitat for Topeka Shiner consists of 9 biological and physical features (e.g., Primary Constituent Elements).

- (1) Streams most often with permanent flow but that can become intermittent during dry periods;
- (2) Side-channel pools and oxbows either seasonally connected to a stream or maintained by groundwater inputs, at a surface elevation equal to or lower than the bankfull discharge stream elevation. The bankfull discharge is the flow at which water begins leaving the channel and flowing into the floodplain, a level generally attained every 1 to 2 years. Bankfull discharge, while a function of the size of the stream, is a fairly constant feature related to the formation, maintenance, and dimensions of the stream channel;
- (3) Streams and side-channel pools with water quality necessary for unimpaired behavior, growth, and viability of all life stages. The water quality components can vary seasonally and include temperature (1 to 30° C) (33.8° F to 86.0° F), total suspended solids (0 to 2000 ppm), conductivity (100 to 800 mhos), dissolved oxygen (4 ppm or greater), pH (7.0 to 9.0), and other chemical characteristics;
- (4) Living and spawning areas for adult Topeka Shiner with pools or runs with water velocities less than 0.5 meters/second (approx. 20 inches/second) and depths ranging from 0.1 to 2.0 meters (approximately 4 to 80 inches);
- (5) Living areas for juvenile Topeka Shiners with water velocities less than 0.5 meters/second (approx. 20 inches/ second) with depths less than 0.25 meters (approx. 10 inches) and moderate amounts of instream aquatic cover, such as woody debris, overhanging terrestrial vegetation, and aquatic plants;
- (6) Sand, gravel, cobble, and silt substrates with amounts of fine sediment and substrate embeddedness that allows for nest building and maintenance of nests and eggs by native *Lepomis* Sunfish [Green Sunfish, Orange-spotted Sunfish, Longear Sunfish] and Topeka Shiner as necessary for reproduction, unimpaired behavior, growth, and viability of all life stages;
- (7) An adequate terrestrial, semiaquatic, and aquatic invertebrate food base that allows for unimpaired growth, reproduction, and survival of all life stages;
- (8) A hydrologic regime capable of forming, maintaining, or restoring the flow periodicity, channel morphology, fish community composition, off-channel habitats, and habitat components described in the other primary constituent elements; and
- (9) Few or no non-native predatory or non-native competitive species present.

In Minnesota, Critical Habitat has been designated in Lincoln, Murray, Nobles, Pipestone and Rock counties (USFWS, 2004)

Topeka Shiner Determination Key Guidance

The proposed action is the compilation of many different types of projects that depending on their size and specific location, often do not significantly affect any federally listed threatened or endangered species or critical habitats in Minnesota and Wisconsin. Common project types include, but are not limited to, the following:

- Vegetation management, including mowing, forestry activities, prescribed burning, and harvest
- Construction, maintenance, operation, and/or removal of:
 - Roads/trails
 - Communication towers
 - Transmission/utility lines
 - Bridges/culverts
 - Oil/gas pipelines
 - Solar power facilities
 - Hydroelectric facilities/ dams
 - Mines/quarries
 - Canals/levees/dikes
- Commercial/residential/recreational developments
- Agricultural activities
- Site/habitat restoration/enhancement
- Shoreline protection/beach nourishment
- Dredging and filling of wetlands/waterbodies
- Military operations

No Effect

Projects that intersect the Topeka Shiner species list area or Critical Habitat (CH) may result in a No Effect (NE)¹ determination if all the following apply:

- The action will NOT permanently or temporarily affect local hydrology
- The action will NOT have any direct or indirect impacts² to a stream or river
- The project will NOT impact the riparian zone³

Not Likely to Adversely Affect

Projects that intersect the Topeka Shiner species list area or CH may result in a Not Likely to Adversely Affect (NLAA)⁴ determination if:

- The action will permanently or temporarily affect local hydrology
 - OR
- The action will have direct or indirect impacts² to a stream or river
 - OR
- The project will impact the riparian zone³
 - OR
- The stream will be temporarily dewatered or diverted
 - AND
- The Topeka Shiner will be prevented from moving into the action area (using fine-mesh block nets) while work is being performed within the stream

- AND
- The project will NOT permanently impair movement of the Topeka Shiner after the activity is complete

May Affect

Projects that intersect the Topeka Shiner species list area or CH may result in a May Affect (MA)⁵ determination for projects if any of the following apply:

- Permanently dewater or divert streams
- Allow Topeka Shiner into the action area while work is being done within the stream
- Permanently impair movement⁶ of Topeka Shiner after the activity

Critical Habitat

Consultation⁷ is required for projects that intersect Topeka Shiner CH and:

- Result in permanent changes to Topeka Shiner habitat quality, quantity, or availability⁸

Topeka Shiner References

- USFWS. (1998, December 15). *Endangered and Threatened Wildlife and Plants; Final Rule to List the Topeka Shiner as Endangered*. Retrieved from US Federal Register: <https://www.govinfo.gov/content/pkg/FR-1998-12-15/pdf/98-33100.pdf#page=1>
- USFWS. (2004, July 27). *Endangered and Threatened Wildlife and Plants; Final Designation of Critical Habitat for the Topeka Shiner*. Retrieved from US Federal Register: <https://www.govinfo.gov/content/pkg/FR-2004-07-27/pdf/04-16646.pdf#page=1>
- USFWS. (2016, November 18). *Recommendations for Projects Affecting Waters Inhabited by Topeka Shiners (Notropis topeka) in Minnesota*. Retrieved from Midwest Region Endangered Species Topeka Shiner (Notropis topeka): <https://www.fws.gov/Midwest/endangered/section7/s7process/fish/TOSHConstructionGuidelinesMN18Nov2016.pdf>
- USFWS. (2018, February 8). *Topeka shiner (Notropis topeka) Species Status Assessment Version 1.0*. Retrieved from USFWS ECOS: <https://ecos.fws.gov/ServCat/DownloadFile/143361>
- USFWS. (2019, May 29). *Midwest Region Endangered Species*. Retrieved from Topeka Shiner Questions and Answers: <https://www.fws.gov/Midwest/endangered/fishes/TopekaShiner/tosh-qas.html>
- USFWS. (2019a, July 11). *Questions and Answers about the Topeka Shiner in Minnesota*. Retrieved from Midwest Region Endangered Species: https://www.fws.gov/midwest/endangered/fishes/TopekaShiner/tosh_mn.html
- USFWS. (2019b, March 11). *Biological Opinion Effects to the Topeka Shiner from the Implementation of State Project 059-602-026, County State Aid Highway 2, Pipestone County, Minnesota Tails# 03E19000-2018-F-1070*. Retrieved from USFWS ECOS: <https://ecos.fws.gov/tails/pub/document/14634295>
- USFWS. (2021a, March 25). *Final Recovery Plan for Topeka Shiner (Notropis topeka)*. Retrieved from USFWS ECOS:

https://ecos.fws.gov/docs/recovery_plan/20210325_Final_Recovery_Plan_for_Topeka_shiner_SIGNED.pdf

USFWS. (2021b, July 21). *Topeka Shiner (Notropis topeka) 5-Year Review: Summary and Evaluation*. Retrieved from USFWS ECOS: https://ecos.fws.gov/docs/tess/species_nonpublish/3376.pdf

¹No effect – The proposed project would result in no effect to this species and/or its federally designated critical habitat (if applicable). Further consultation with the USFWS Minnesota Wisconsin Ecological Services Field Office is not necessary for the project as described.

²Direct or indirect impacts to a stream or river - Horizontal directional drilling, hydrostatic testing, stream/road crossings, new stormwater outfall discharge, dams, other in-stream work, etc.

³Impacts to riparian zone - Cut and fill; horizontal directional drilling; construction; vegetation removal; pesticide or fertilizer application; discharge; runoff of sediment or pollutants; increase in erosion, etc.

⁴NLAA – For projects that reach a “not likely to adversely affect” determination, there is a 30 day “verification period” to allow the USFWS to review the project details and ensure the action meets the criteria for a NLAA determination. Output letters will indicate that if the project proponent does not hear otherwise within that timeframe, the NLAA determination is verified and they can proceed with their action as described in the IPaC report and concurrence verification letter. This verification period allows the USFWS Minnesota Wisconsin Ecological Services Field Office to apply local knowledge to evaluation of the action and ensure actions do not have unanticipated impacts. Thus, there may be a small subset of actions for which the USFWS Minnesota Wisconsin Ecological Services Field Office may request additional information during this timeframe to verify the effects determination reached through the IPaC Dkey.

⁵May affect – Further consultation with the USFWS Minnesota Wisconsin Ecological Services Field Office is necessary in order to discern if the activity would result in a “no effect”, “not likely to adversely affect”, or “likely to adversely affect” determination.

⁶An improperly placed culvert that does not allow upstream movement; blocked, dammed, or filled rivers, streams, or oxbows for example.

⁷Consultation required - Further consultation with the USFWS Minnesota Wisconsin Ecological Services Field Office is necessary in order to discern if the activity would result in a “no effect”, “not likely to adversely affect”, or “likely to adversely affect” determination.

⁸Diverted or dewatered stream; increased siltation or erosion; blocked, dammed or filled streams or oxbows; removal of riparian vegetation, etc.

Appendix 26 – Western Prairie Fringed Orchid (*Platanthera praeclara*)

Western Prairie Fringed Orchid Species Summary

The Western Prairie Fringed Orchid is currently listed by the U.S. Fish and Wildlife Service (USFWS) under the Endangered Species Act (ESA) as ‘threatened’ across its range (USFWS, 1989). Major threats to Western Prairie Fringed Orchid are conversion of prairie to cropland, spread of invasive plants, encroachment of woody vegetation and hydrologic changes (USFWS, 2021a). Additional threats include overgrazing, intensive hay mowing, inter-seeding of non-native species, collection, low seed sets from small, isolating populations, herbicides, and pesticides (USFWS, 2009). The USFWS species profile for the Western Prairie Fringed Orchid can be found at <https://ecos.fws.gov/ecp/species/1669>. Additional information can be found at <https://www.fws.gov/species/great-plains-white-fringed-orchid-platanthera-praeclara>. A summary of the ecology of this species can be found in the USFWS Western Prairie Fringed Orchid recovery plan (USFWS, 1996) and the most recent 5-year review (USFWS, 2021a). No critical habitat has been designated for this species.

Western Prairie Fringed Orchid Biological Information

The Western Prairie Fringed Orchid is a terrestrial member of the orchid family. This smooth, erect, perennial herbaceous plant grows to 1.2 meters (4 feet) tall. Plants have 2–5 thick, elongate, hairless leaves each. The open, spike-like flowering stalk bears up to 24 showy, 2.5 centimeters (1-inch) wide, white flowers (**Figure 1**). The lower petal of each flower is deeply 3-lobed and fringed. Western Prairie Fringed Orchid is pollinated by a few species of sphinx moths (USFWS, 2009). Seeds are wind-dispersed and may also be adapted for dissemination through the soil profile by water (USFWS, 2021b). It is dependent on mycorrhizal fungi, especially for seed germination and for nutritional support before plants are capable of photosynthesis (Sharma, 2002).



Figure 1. *Western Prairie Fringed Orchid* (USFWS, J. Challey)

Western Prairie Fringed Orchid Suitable Habitat

The Western Prairie Fringed Orchid is most often found on unplowed, calcareous prairies and sedge meadows of the Northern American tallgrass prairie (USFWS, 1996). Suitable habitat for Western Prairie Fringed Orchid in Minnesota is wet or moderately moist (mesic) prairie or sedge meadows with level or gently sloping topography (**Figure 2**). In some cases, the species may also occur along ditches or roadsides where this type of habitat is present (USFWS, 2006). Habitat conditions may vary across the Western Prairie Fringed Orchid range. In northwestern Minnesota, it occurs in areas where standing water is present, while populations in southern Minnesota are on shallow soils over bedrock where water is not present in the spring (USFWS, 2021a). Annual fluctuations in groundwater depth may influence the amount of moisture available to orchids and result in spatial shifts of orchid populations on the landscape (Knudson, 2014). The persistence of Western Prairie Fringed Orchid is dependent on periodic disturbance by fire, mowing, or grazing, but these practices may also cause adverse effects and must be carefully implemented (USFWS, 2021b).



Figure 2. *Western Prairie Fringed Orchid in tallgrass prairie (Ben Sullivan)*

The Western Prairie Fringed Orchid occurs in Clay, Kittson, Lincoln, Marshall, Nobles, Norman, Pennington, Pipestone, Polk, Red Lake, Rock, and Roseau counties in Minnesota.

Western Prairie Fringed Orchid Critical Habitat

Critical habitat has not been designated for the Western Prairie Fringed Orchid.

Western Prairie Fringed Orchid Determination Key Guidance

The proposed action is the compilation of many different types of projects that, depending on their size and specific location, often do not significantly affect any federally listed threatened or endangered species or critical habitats in Minnesota and Wisconsin. Common project types include, but are not limited to, the following:

- Vegetation management, including mowing, forestry activities, prescribed burning, and harvest
- Construction, maintenance, operation, and/or removal of:
 - Roads/trails
 - Communication towers
 - Transmission/utility lines
 - Bridges/culverts
 - Oil/gas pipelines
 - Solar power facilities
 - Hydroelectric facilities/ dams
 - Mines/quarries
 - Canals/levees/dikes
- Commercial/residential/recreational developments
- Agricultural activities
- Site/habitat restoration/enhancement
- Shoreline protection/beach nourishment
- Dredging and filling of wetlands/waterbodies
- Military operations

No Effect

Projects that intersect the Western Prairie Fringed Orchid species list area may result in a No Effect (NE)¹ determination if both of the following apply:

- A survey was completed, and the Western Prairie Fringed Orchid was not detected.
 - Upload the survey results to IPaC. If unable to upload the survey to IPaC, email the survey results to the MNWI ES Field Office (TwinCities@fws.gov).
- The action area occurs in unsuitable habitat.

Not Likely to Adversely Affect

Projects that intersect the Western Prairie Fringed Orchid species list area may result in a Not Likely to Adversely Affect (NLAA)² determination if:

- There are restrictions on stream/hydrology-impacting or vegetation/ground-disturbing activities within the species list area/buffered habitat. Restrictions include actions that are likely to change the elevations of surface water upstream or downstream, or in the local groundwater (as estimated pre-action vs. post-action); as well as the potential to impact the riparian zone (up to 200 feet) or indirectly impact a stream or river (e.g., cut and fill, horizontal directional drilling, construction, vegetation removal, pesticide or fertilizer application, discharge, runoff of sediment or pollutants, increase in erosion).
- Restrictions on actions that may fragment habitat or create barriers to movement/dispersal within the species list area.

May Affect

Projects that intersect the Western Prairie Fringed Orchid species list area and have either determined presence through a survey or have not conducted a survey will result in a May Affect (MA)³ determination if any of the following occurs:

- Suitable habitat is present
- Suitable habitat is present in the surrounding area
- There are known elemental occurrences⁴ in the action area/surrounding area
- There is evidence of habitat fragmentation in the action area/surrounding area
- The action occurs during flowering season
- Wetland delineation or habitat assessment/survey suggest presence of the species
- The species is observed during a site visit or there are reports of presence
- Disturbance of the ground or existing vegetation⁵
- Indirect alteration of the habitat or resources of the listed plant(s)⁶
- Direct harm to the listed plant(s)⁷

Western Prairie Fringed Orchid References

Knudson, M. D. (2014). *Defining Western Prairie Fringed Orchid (Platanthera Praeclara) Habitat Thesis*. Grand Forks: University of North Dakota.

Sharma, J. (2002). *Mycobionts, germination, and conservation genetics of federally threatened Platanthera praeclara (Orchidaceae)*. Ann Arbor: ProQuest.

- USFWS. (1989, September 28). *Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for Eastern and Western Prairie Fringed Orchids*. Retrieved from US Federal Register: <https://www.govinfo.gov/content/pkg/FR-1989-09-28/pdf/FR-1989-09-28.pdf#page=145>
- USFWS. (1996, September 30). *Western Prairie Fringed Orchid Recovery Plan*. Retrieved from USFWS ECOS: https://ecos.fws.gov/docs/recovery_plan/960930a.pdf
- USFWS. (2006, March 27). *Determining Whether Western Prairie Fringed Orchid (Platanthera praeclara) May be Present in a Project Area in Minnesota*. Retrieved from USFWS Midwest Region Endangered Species: https://www.fws.gov/midwest/endangered/section7/s7process/plants/pdf/wpfo_s7guide.pdf
- USFWS. (2009, April 27). *Western Prairie Fringed Orchid (Platanthera praeclara) 5-Year Review: Summary and Evaluation*. Retrieved from USFWS ECOS: https://ecos.fws.gov/docs/tess/species_nonpublish/1353.pdf
- USFWS. (2021a, May 12). *Western Prairie Fringed Orchid (Platanthera praeclara) 5-Year Review: Summary and Evaluation*. Retrieved from USFWS ECOS: https://ecos.fws.gov/docs/tess/species_nonpublish/964.pdf
- USFWS. (2021b, November 3). *Western prairie fringed Orchid (Platanthera praeclara)*. Retrieved from USFWS ECOS: <https://ecos.fws.gov/ecp/species/1669>

¹No effect – The proposed project would result in no effect to this species and/or its federally designated critical habitat (if applicable). Further consultation with the USFWS Minnesota Wisconsin Ecological Services Field Office is not necessary for the project as described.

²NLAA – For projects that reach a “not likely to adversely affect” determination, there is a 30-day “verification period” to allow the USFWS to review the project details and ensure the action meets the criteria for an NLAA determination. Output letters will indicate that if the project proponent does not hear otherwise within that timeframe, the NLAA determination is verified, and they can proceed with their action as described in the IPaC report and concurrence verification letter. This verification period allows the USFWS Minnesota Wisconsin Ecological Services Field Office to apply local knowledge to evaluation of the action and ensure actions do not have unanticipated impacts. Thus, there may be a small subset of actions for which the USFWS Minnesota Wisconsin Ecological Services Field Office may request additional information during this timeframe to verify the effects determination reached through the IPaC DKey.

³May affect – Further consultation with the USFWS Minnesota Wisconsin Ecological Services Field Office is necessary in order to discern if the activity would result in a “no effect”, “not likely to adversely affect”, or “likely to adversely affect” determination.

⁴Elemental occurrence data can be accessed from the Wisconsin Natural Heritage Inventory: <https://dnr.wisconsin.gov/topic/NHI> and the Minnesota Department of Natural Resources Natural Heritage Information System: <https://www.dnr.state.mn.us/nhnrp/nhis.html>

⁵This includes any off-road vehicle access, soil compaction, digging, seismic survey, directional drilling, heavy equipment, grading, trenching, placement of fill, pesticide application (herbicide, fungicide), vegetation management (including removal or maintenance using equipment or chemicals), cultivation, development, etc.

⁶For example, actions that cause a change in canopy cover, microclimate, humidity, increase in invasive species, hydrologic alterations, etc.

⁷For example, through mowing/haying, prescribed fire, herbicide application, trampling, increased herbivory, cutting/clearing, cultivation, crushing by vehicle, reduction to possession, etc.

Appendix 27 – Winged Mapleleaf Mussel (*Quadrula fragosa*)

Winged Mapleleaf Mussel Species Summary

The Winged Mapleleaf Mussel is currently listed by the U.S. Fish and Wildlife Service (USFWS) under the Endangered Species Act (ESA) as ‘endangered’ across its range (USFWS, 2012). Habitat fragmentation, small population size (inbreeding) and the invasive Zebra Mussel are threats to the species (USFWS, 2015). The USFWS species profile for Winged Mapleleaf Mussel can be found at <https://ecos.fws.gov/ecp/species/4127>. Additional information can be found at <https://fws.gov/species/winged-mapleleaf-quadrula-fragosa>. A summary of the ecology of this species can be found in the USFWS Winged Mapleleaf Mussel recovery plan (USFWS, 1997) and the most recent 5-year review (USFWS, 2015). A nonessential experimental population was established in Alabama in 2001 (USFWS, 2001). No critical habitat has been designated for this species.

Winged Mapleleaf Mussel Biological Information

Adult Winged Mapleleaf Mussels can grow up to 4 inches (10.2 centimeters). They have thick shells that are greenish brown, chestnut or dark brown in color (**Figure 1**). Their shell has several rows of bumps running from the hinge, or *umbo*, to the edge of the shell. Faint rays are visible in small shells. The epidermis of adults is dull brown, usually with 2 or 3 broad and widely interrupted green rays. Anterior and posterior ends are squared or truncated. The beak sculpture has 2 rows of raised nodules that continue down the surface of the shell separated by a furrow. The pseudocardinal teeth are well developed and serrated and laterals are long, striated, and straight. The nacre is an iridescent, pearly white (WDNR, 2020).

Male Winged Mapleleaf Mussels release sperm in the water column that is then siphoned by the female to fertilize her eggs. Fertilized eggs develop into microscopic larvae, called glochidia, within special gill chambers. After brooding, the female expels mature glochidia, which then must attach to the gills or fins of a specific host fish species to complete development into juvenile mussels. If successfully attached to a host fish, glochidia mature within a few weeks. Juvenile mussels then drop off and continue to grow if they fall onto appropriate substrate. Known Winged Mapleleaf Mussels host fish are Channel and Blue Catfish (USFWS, 2015). The Winged Mapleleaf Mussel has a late and short breeding period. The breeding period is from late August to mid-September (USFWS, 2000).

Adult Winged Mapleleaf Mussels are suspension-feeders, siphoning water and feeding on suspended algae, bacteria, detritus, microscopic animals, and dissolved organic material. Adult mussels spend their entire lives partially or completely buried within river bottom substrates.



Figure 1. Winged Mapleleaf Mussel (J. Harris, USFWS)

Winged Mapleleaf Mussel Suitable Habitat

The Winged mapleleaf Mussel is found in medium-sized rivers with fast-flowing riffles and clean gravel, sand or rubble bottoms in clear, high-quality water with consistent stream flow (**Figure 2**) (Eatwell, 2014). In the past, it may also have been found in large rivers and streams on mud, mud-covered gravel and gravel bottoms.



Figure 2. St. Croix River, WI (Wisconsin Trail Guide)

In Minnesota and Wisconsin, the Winged Mapleleaf Mussel only occurs in a 6-mile (9-kilometer) reach in the St. Croix River (USFWS, 2015).

Winged Mapleleaf Mussel Critical Habitat

Critical habitat has not been designated for the Winged Mapleleaf Mussel.

Winged Mapleleaf Mussel Determination Key Guidance

The proposed action is the compilation of many different types of projects that depending on their size and specific location often do not significantly affect any Federally listed threatened or endangered species or critical habitats in Minnesota and Wisconsin. Common project types include, but are not limited to, the following:

- Vegetation management, including mowing, forestry activities, prescribed burning, and harvest
- Construction, maintenance, operation, and/or removal of:
 - Roads/trails
 - Communication towers
 - Transmission/utility lines
 - Bridges/culverts
 - Oil/gas pipelines
 - Solar power facilities
 - Hydroelectric facilities/ dams
 - Mines/quarries
 - Canals/levees/dikes
- Commercial/residential/recreational developments
- Agricultural activities
- Site/habitat restoration/enhancement
- Shoreline protection/beach nourishment
- Dredging and filling of wetlands/waterbodies
- Military operations

No Effect

Projects that intersect the Winged Mapleleaf Mussel species list area may result in a No Effect (NE)¹ determination if:

- The action will NOT permanently affect local hydrology
AND
- will NOT have any direct² impacts to a stream or river
AND
- does NOT have the potential to impact the riparian zone
OR
- will NOT have indirect³ impacts to a stream or river

Not Likely to Adversely Affect

Projects that intersect the species list area may result in a Not Likely to Adversely Affect (NLAA)⁵ determination if:

- An approved survey⁶ was conducted and Higgins Eye were not observed⁷ in the project area.

May Affect

Projects that intersect the Winged Mapleleaf Mussel species list area may result in a May Affect (MA)⁴ determination if:

- The action will temporarily or permanently affect local hydrology
OR
- will have any direct² or indirect³ impacts to a stream or river
OR
- has the potential to impact the riparian zone

Winged Mapleleaf Mussel References

- Eatwell, Q. (2014). "*Quadrula fragosa*" (On-line). Retrieved from Animal Diversity Web:
https://animaldiversity.org/accounts/Quadrula_fragosa/#99B02E6E-9426-11E2-84CB-002500F14F28
- USFWS. (1997, June 25). *Winged Mapleleaf Mussel Recovery Plan (Quadrula fragosa)*. Retrieved from USFWS ECOS: https://ecos.fws.gov/docs/recovery_plan/970625.pdf
- USFWS. (2000). *Determination of basic reproductive characteristics of the winged mapleleaf mussel (Quadrula fragosa) relevant to recovery. MWBC 2601400*. Madison, WI: USFWS.
- USFWS. (2001, August 21). Endangered and Threatened Wildlife and Plants; Establishment of Nonessential Experimental Population Status for 16 Freshwater Mussels and 1 Freshwater Snail (Anthony's Riversnail) in the Free-Flowing Reach of the Tennessee River below the Wilson Dam, Colb. *US Federal Register*, pp. <https://www.govinfo.gov/content/pkg/FR-2001-08-21/pdf/01-21071.pdf#page=1>.
- USFWS. (2012, March 13). *Endangered and Threatened Wildlife and Plants; Determination of Endangered Status for the Sheepnose and Spectaclecase Mussels Throughout Their Range*. Retrieved from US Federal Register: <https://www.govinfo.gov/content/pkg/FR-2012-03-13/pdf/2012-5603.pdf#page=2>
- USFWS. (2015, May 15). *Winged Mapleleaf (Quadrula fragosa) 5-Year Review: Summary and Evaluation*. Retrieved from USFWS ECOS: https://ecos.fws.gov/docs/tess/species_nonpublish/3379.pdf
- WDNR. (2020, October 8). *Winged Mapleleaf (Quadrula fragosa)*. Retrieved from WDNR: <https://dnr.wi.gov/topic/EndangeredResources/Animals.asp?mode=detail&SpecCode=IMBIV39050>

¹No effect – The proposed project would result in no effect to this species and/or its federally designated critical habitat (if applicable). Further consultation with the USFWS Minnesota Wisconsin Ecological Services Field Office is not necessary for the project as described.

²Horizontal Directional Drilling, hydrostatic testing, stream/road crossings, new stormwater outfall discharge, dams, other in-stream work, etc.

³Cut and fill, horizontal directional drilling, construction, vegetation removal, pesticide or fertilizer application, discharge, runoff of sediment or pollutants, increase in erosion, etc.

⁴May affect – Further consultation with the USFWS Minnesota Wisconsin Ecological Services Field Office is necessary in order to discern if the activity would result in a “no effect”, “not likely to adversely affect”, or “likely to adversely affect” determination.

⁵NLAA – For projects that reach a “not likely to adversely affect” determination, there is a 30 day “verification period” to allow the USFWS to review the project details and ensure the action meets the criteria for a NLAA determination. Output letters will indicate that if the project proponent does not hear otherwise within that timeframe, the NLAA determination is verified and they can proceed with their action as described in the IPaC report and concurrence verification letter. This verification period allows the USFWS Minnesota Wisconsin Ecological Services Field Office to apply local knowledge to evaluation of the action and ensure actions do not have unanticipated impacts. Thus, there may be a small subset of actions for which the USFWS Minnesota Wisconsin Ecological Services Field Office may request additional information during this timeframe to verify the effects determination reached through the IPaC Dkey.

⁶You must receive prior approval for any proposed mussel survey by contacting the Minnesota-Wisconsin Ecological Services Field Office. All mussel surveys in Minnesota and Wisconsin must comply with State approved protocols.

Minnesota Mussel Protocol: <https://files.dnr.state.mn.us/eco/nhnrp/mn-mussel-survey-and-relocation-protocol.pdf>.

Wisconsin Mussel Protocol:

https://molluskconservation.org/Library/Protocol%20PDFs/WI%20Wadable%20Mussel%20Protocol_8-18-15.pdf

⁷A positive observation includes collection of any shells (live or dead and in any condition)